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TABLE OF CONTENTS

How Odynerus Suspends Her Egg. *C. G. Hartman* .......... 1

A New Fungus Growing Ant from Mexico. *W. F. Buren* .......... 5

Obituary .......... 7

Three New African Species of Mordellid Beetles. *Eugene Ray* .......... 8

Further Studies of the Tabanidae of Trinidad, B.W.I. *J. Bequaert* .......... 12

Studies on Syrphid Flies in the Museum of Comparative Zoölogy. *F. M. Hull* 22

Some African Bees of the Genus Nomia. *T. D. A. Cockerell* .......... 46

Wasps Feeding on Comb Honey. *Phil Rau* .......... 50

Three Species of Coleosoma from Florida (Araneæ; Theridiidæ). *E. B. Bryant* .......... 51

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# PSYCHE

Vol. LI Mar.–June, 1944 Nos. 1–2

# HOW ODYNERUS SUSPENDS HER EGG

By Carl G. Hartman

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So far as the writer is aware it was he and his sons, Philip and Paul, amateur entomologists, who first witnessed a Eumenid wasp expel her egg and hang it from the ceiling of her nest — or rather suspend it and then expel the egg, for, as a matter of fact, the thread is made first. Dame Fortune was with us further in that the very first time we witnessed the act we had the movie camera set up, loaded with Kodachrome, and so secured a motion picture of oviposition.

For some forty years, on numerous occasions, I have amused myself and bored tolerant friends by attracting certain solitary bees and wasps ("tube fillers") to my window-sill by setting out tubes of various diameters suitable for their occupancy. Trypoxylon and Odynerus were sure to be there, also small bees as well as the larger Megachile, the leaf cutter. The last mentioned proved especially popular with the amateur naturalist. The method most often employed was that well described and figured by Savin (Natural History, 1922). This method consists essentially of screwing together two smooth-faced boards and boring holes of various diameters down the surface of junction. By removing the screws the work of insects could readily be laid bare. Bamboo tubes and even rubber tubing were also set out, but the latter does not favor the survival of the wasp grubs. In vacation time of 1941, however, at Bethlehem, Connecticut, all energies were devoted to watching and photographing the insects as they worked in glass tubes. No better means can be imagined for prying into the insects' domestic activities than by inducing them to live in glass houses! In this the insects proved most coöperative.

It is the object of the present paper to describe the egg-laying of *Odynerus* (*Rygchium*) *rugosus* (Sauss) = *foraminatus* (Sauss) as observed and photographed by the glass-tube method.

Bamboo tubes which served as sheaths for the glass tubes so as to afford the requisite darkness of the interior, were tacked on a tree-trunk or the side of the house or other comfortable shady place, and developments awaited. Light for instantaneous photography was secured by reflecting sunlight on the tube by means of a mirror.

The egg is always laid before the prey is captured and the cell stored. Trypoxylon and many others reverse this sequence. The signal for the egg-laying ceremony consists in the wasp's turning around and backing into the tube. Egg laying is the only act for which this orientation is necessary.

After entering the tube the more or less excitable female comes gradually to rest supinely on her wings, with tip of abdomen directed upward close to the mud partition. The rapid breathing movements (air temperature 90° F!) are soon accompanied by another type of movement, a comparatively slow, rhythmic contraction of the abdomen, in which the abdominal segments seem alternately to telescope and evert as the tip of the abdomen is retracted and extended. In the words of the observant young assistants: "She's pumpin' an egg." With each extension of the abdomen the tip comes in contact with the ceiling. Presently a drop of whitish secretion appears and is touched to the ceiling. There it sticks; and as the abdomen is withdrawn a thread is drawn out and instantly hardens, remaining flexible and tough, for subsequent movements of the abdomen do no injury to it.

The abdominal movements continue uninterruptedly until gradually the egg begins to slide out. The motion picture shows the egg free for about one-third of its length when a sudden jump in the film occurs to the point where the egg is two-thirds emerged, the interval marking the time that the camera was being rewound.

As soon as the egg is free, it is seen to dangle by its thread like a tiny pendulum.

### *Function of the Thread*

On the adaptive significance of the suspensory thread of the Eumenid egg or its possible phylogenic history, the writer has no contribution to make. Several observations, however, may be cited confirmatory of Ch. Ferton's contention (Collected Works,

1923) that Fabre laid too much stress on the correlation of the well-known liveliness of Eumenid's caterpillars and the alleged delicacy of the Eumenid egg.

It is a matter of common observation that the Eumenid prey is seldom stung to death. On opening a nest of Eumenes or Odynerus practically all of the caterpillars respond to stimulation and many move spontaneously. It is not at all a rare occurrence that a caterpillar begins to crawl as soon as set free. One of the scenes in our motion pictures of Eumenes is that of a merry scramble of four or five surviving caterpillars with two large wasp grubs holding on — for this case concerned an exceptional nest in which two eggs had been laid.

Fabre considered the egg much too delicate to stand the jostling of such vivacious prey entombed alive; he states that he was never able to rear grubs from eggs that were disturbed or removed from their original sites. But not so Ferton, who seldom failed under similar circumstances. Indeed, he once dropped an egg with the lively canker worms into a bottle, carried the specimens some miles on horseback, yet reared a wasp from the egg. We have also reared wasps from eggs that had been carried about in the jug nests of Eumenes or in bamboo tubes stored by Odynerus, although these were not handled with any special reference to the force of gravity.

Ferton points out, furthermore, that the cells are usually so tightly packed with caterpillars that the egg must needs be pressed against the wall and not able to dangle freely at all. This can readily be corroborated by opening almost any fully stored cell. If one split a bamboo tube full of caterpillars, it will be seen that the masses of worms literally swell up as the retaining wall is removed.

To these points we are able to add our direct observation on what happens to the egg as viewed through the wall of the glass tube while the insect is at work.

After the egg has been suspended in the depth of the cell, foraging begins. As the caterpillars are brought in they are stuffed with might and main into a closely fitting firm mass at the bottom of the cell. This happens also in smooth-walled glass tubes in which the worker finds only a precarious footing. The egg is always pushed around and often squeezed against the glass or between caterpillars, which are thus thoroughly immobilized by virtue of mutual pressure.

Ferton is of the opinion that the chief value of the suspensory thread for racial survival lies in the avoidance of contact by the egg with the wet wall of the cell. All predacious wasps seem particular as to the site of attachment of the egg, usually choosing the upper surface of the prey; or, if the egg is laid on the ground, as in the case of certain fly-catchers that feed the prey from day to day, a pebble is chosen to receive the egg. Of interest in this connection is the "transitional" habit of *Rhaphiglossa zethoides*, a solitary Vespid which attaches its egg, not by a thread, but by an elongated end in such a way that the egg projects away from the wall at an angle of about 45°. This wasp is of further phylogenetic interest in the use of both wood fiber, after the manner of the social wasps, and mud, which solitary Sphecina as well as Vespina usually employ.

*Summary.* The act of oviposition of *Odynerus rugosus* is here described and the probable function of the suspensory thread of the Eumenid egg is discussed.

# A NEW FUNGUS GROWING ANT FROM MEXICO

By William F. Buren
Alexandria, Louisiana

## **Trachymyrmex smithi, n. sp.**

### Worker.

Similar to *T. septentrionalis obscurior* but black in color and with several structural differences.

Length about 3.5 to 4.0 mm.

Head, excluding mandibles, a little broader than long, wider behind than in front, with the hind border excised in an obtuse angle, and the sides feebly convex. Head broadest midway between the eyes and posterior corners. Clypeus broadly notched in the middle. Frontal carinæ more mesally placed than in many species of *Trachymyrmex*, produced laterally into subtriangular lobes in front, becoming faint behind and fading out before reaching the hind border of the head. Scapes surpassing posterior corners of head by about one fourth of their length. All funicular joints longer than broad. Antennal scrobes indistinct behind. Genal carinæ curving obliquely mesad past the level of the eyes. No postocular carinæ. Eyes hemispherical. A single short blunt spine behind each posterior corner of the head.

Thorax rather robust. Mesoepinotal impression moderately deep. Inferior pronotal spines small and lappet-shaped. Median superior pronotal spines separate and rather blunt. Lateral pronotal spines blunter than in *obscurior*, projecting laterally and curving slightly ventrad toward the tip. Three pairs of spines on the mesonotum. The first pair not as long as the lateral pronotal pair but blunter and more robust, broader at the base than high. The posterior two pairs of mesonotal spines much smaller and somewhat sharper. Epinotal spines slender and sharp. Rows of tubercles run forward on the epinotum from the epinotal spines to form longitudinal carinæ, and other rows of tubercles form rather feeble oblique carinæ on the pleuræ of the epinotum and mesonotum.

Petiole and postpetiole much as in *obscurior* but the petiole is longer, its anterior dorsal face more sloping. Postpetiole notched behind as in *obscurior*. The tubercles on petiole and postpetiole larger and more spine-like than in *obscurior*.

Lateral ridges and longitudinal depressions on first segment of gaster indistinct or absent.

Mandibles striate and rather shining. All other regions opaque, densely and finely punctate, giving a granular appearance. Tubercles and hooked hairs moderately numerous, about as in *obscurior*. The thoracic spines are abundantly covered with hairs and tubercles. No tubercles on legs, scapes, pronotum anterior to the spines, most pleural regions of the thorax, and venters of pedicel and gaster, although these parts have numerous hooked hairs. Tubercles larger on occipital lobes than on other parts of head; tubercles on vertex and hind portions of antennal scrobes often prolonged into small longitudinal ridges, or connected by ridges to form small longitudinal carinulæ. No pubescence except on funiculi.

Color entirely black except for the mandibles, tarsi, and articulations of femora and tibiæ, which are brown.

Male and female unknown.

Described from 59 specimens collected November 5 and November 8, 1942, from the same nest in the desert near La Rosa, in the state of Coahuila, Mexico (Elinor Buren, collector). Holotype in the author's collection; paratypes in the author's collection and in the National Museum. The nest was of a simple crater type unlike that of *turrifex* or *septentrionalis*. The ants were extremely slow and sedate in movement even in hot sunlight. They were observed bringing in small green bits which seemed to be pieces of grass. The hard soil prevented excavation.

*T. smithi* seems most closely related to *T. septentrionalis obscurior* Wheeler but the black color, broader, more robust head and thorax, differently shaped thoracic spines, weaker frontal carinæ, etc., seem sufficient distinctive characters.

This species is not closely related to *turrifex* which also occurs in northern Mexico (Vallecillo, Nuevo Leon). *T. turrifex* has shorter antennæ, a different color, narrower head, differently shaped frontal and genal carinæ, tubercles on legs and scapes, etc.

*T. jamaicensis* and its variants often approach or are similar in color to *smithi*, but these forms may be easily distinguished by the three prominent spines or large tubercles on each occipital lobe, the differently shaped head, eyes, thoracic spines, etc.

*T. saussurei*, *arizonensis*, and *desertorum* may all be distinguished by their ferruginous color and various differences in shape, spinulation, and tuberculation.

I take great pleasure in dedicating this species to an outstanding American myrmecologist, Dr. M. R. Smith, of the National Museum.

I am indebted to Dr. Smith for his kindness in comparing specimens of *T. smithi* with an undescribed species of *Trachymyrmex* from Lower California in his possession.

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The secretary of the Cambridge Entomological Club regrets to announce the death of Mr. Charles V. Blackburn at Stoneham, Mass., on April 11, 1944, in his 88th year. He was a member of the Club for 41 years, having been elected at the 232nd meeting, December 15, 1903. In 1942 he was elected an honorary member.

# THREE NEW AFRICAN SPECIES OF MORDELLID BEETLES

By Eugene Ray

Chicago, Illinois

The following descriptions were made from a lot of eleven specimens collected in the Sudan region of Africa by A. P. G. Michelmore and R. C. M. Darling and sent to the writer by Sir Guy A. K. Marshall, Director of the Imperial Institute of Entomology, British Museum (Natural History). The types of the new species hereinafter described are temporarily placed in the Chicago Natural History Museum, while paratypes remain in the collection of the writer.

## Tomoxia abrupta new species

Form short, sides subparallel, derm generally black, with the following exceptions: anterior and intermediate legs and seven distal segments of antennæ fuscocastaneous; four proximal segments of antennæ, palpi, front, and mesal margin of mandibles castaneous. Body densely covered with fine recumbent pubescence, a solid golden on head and pronotum, black on scutellum, an irregular golden area covering basal third of elytra, enclosing an irregular black area on either side of scutellum near base, an irregular, transverse, golden band behind middle, reaching suture but not middle and connected with basal area by a short sutural line, with intervening and subsequent areas blackish-pubescent; ventral surface blackish-pubescent, except for the following whitish areas: meso- and metasternum, 1st and 2nd abdominal segments (except at apical margin), and third segment along basal margin.

(♀). Antennæ 1.4 mm. long, reaching metasternum; segments 1 and 2 equal; 3 distinctly longer than 4, latter broadest at apex; 5 as long as 3, but broader; 6–10 strongly serrate, as broad as long; 11 one-half longer than 10, inner margin and apex rounded, broadest at middle. Terminal segment of maxillary palpi enlarged, with form of a scalene triangle, sides and angles all strongly rounded, mesal margin thickest, divided longitudinally, with a concave, elongate depression between the edges. Head strongly flattened antero-posteriorly, front, clypeus, and vertex forming a straight line. Eyes reaching occiput.

Pronotum distinctly broader than long (2.0 × 1.8 mm.), anterior margin and sides rounded, base arcuate, midbasal lobe short, broad, subtruncate. Scutellum subquadrate, sides but slightly angular, apical margin truncate.

Elytra short, but four-tenths longer than broad (3.2 × 2.0 mm.), sides attenuate to apex, apices individually rounded. Anal style short, thick, truncate at apex, but one-half longer than hypopygium (1.5 × 1.0 mm.). Posterior tarsal claws with five teeth, two premedian, the first very small, the other distinct; three postmedian, first larger than any other except terminal one, second small, third terminal.

(♂). The males are darker, the castaneous parts of the female being almost piceous in this sex. The elytral markings are more restricted, the posterior band being curved anteriorly at the suture and lateral margins.

Length: to apices of elytra, 3.3–5 mm.; to tip of anal style, 4.3–6.5 mm.

Five specimens: male *type* and two male paratypes, Wady Madu, N. E. Darfur, July 25, 1930, at flowers of *Premna resinosa* (Michelmore); one male paratype, Plain below J. Kaboija, J. Midob, N. E. Darfur, August 7, 1930, common on leaves and flowers of large succulent grasses (Michelmore); one female paratype, Duani, wilderness of Toganoy, N. E. Darfur, August 12, 1930, on foliage of *Grewia flavescens* (Michelmore).

This species may easily be separated from the only other African member of the genus, *T. robusta* Pic (Rev. zool. bot. afr. 21, 1931, p. 45), by the wholly different pubescent markings, the unicolored abdomen and legs, the bicolored antennæ, and the larger size. Mr. Pic's short diagnosis unfortunately does not permit a more adequate comparison.

### **Mordellistena sudaniensis** new species

Form elongate, sides subparallel, derm generally black, with the following exceptions: anterior and intermediate legs, front, palpi, and three basal antennal segments flavocastaneous; posterior legs fuscocastaneous. Body densely covered with fine, recumbent, cinereous pubescence and minute, closely-placed tubercles.

Antennæ 0.9 mm. long, reaching metasternum; segments 3–4 equal in length, the latter a little broader; 5–10 each one-third longer than 4 and almost twice as broad as 3, broadest subapically; 11 one-half longer than 10, sides and apex rounded, broadest medially. Terminal segment of maxillary palpi enlarged, slender, three times as long as broad at widest point, ovoid, outer side somewhat less rounded than inner margin, broadest on apical half.

Pronotum as long as broad (0.8 mm.), sides and apex rounded, base arcuate, midbasal lobe short, subtruncate.

Elytra two and three-fourths times as long as broad (2.2 × 0.8 mm.), sides subparallel to within a fourth of apex, then strongly curved, apices individually rounded. Anterior and intermediate tarsi longer than their tibiæ. Posterior tibiæ with two strong ridges (excluding subapical one), the anterior extending obliquely entirely across outer face; basitarsi with three, second segment with two oblique ridges. Anal style short, subtruncate at apex, but twice length of hypopygium (0.7 × 0.35 mm.).

Length: to apices of elytra, 3 mm.; to tip of anal style, 3.7 mm.

Four specimens. Type, male, and two female paratypes, El Wuz, September 17, 1931, at light (Darling); a male paratype, Plain below J. Kaboija, J. Midob, N. E. Darfur, August 7, 1930, common on leaves of large succulent grasses (Michelmore).

This species is allied to *diffinis* Mäklin (Acta Soc. Sci. Fenn. 10, 1875, p. 586), but may easily be separated by the larger size, the much shorter anal style, the lighter appendages, the shorter and broader pronotum and elytra, and the elongate anterior ridge of the posterior tibiæ.

### Mordellistena darfurensis new species

Form elongate, sides subparallel; head, mouth parts, antennæ (outer segments darker), pronotum, and anterior and intermediate legs, flavo- or fuscocastaneous, thorax sometimes with an indefinite dorsal cloud; meso- and metasternum, abdomen, posterior legs, and elytra, black. Body densely covered with fine, recumbent, flavocinereous pubescence.

Antennæ 1 mm. long, reaching metasternum; segments 3–4 equal; 5–10 each one-third longer than 4 and considerably broader, broadest subapically; 11 one-third longer than 4 and considerably broader; 11 one-third longer than 10, sides and apex rounded, broadest medially. Terminal segment of maxillary palpi enlarged, slender, two and one-half times as long as broad, with the form of a scalene triangle, outer edge straight, other margins and angles rounded, broadest at a postmedian point.

Pronotum as long as broad (1 mm.), sides and angles broadly rounded, basal angles obtuse, base arcuate, midbasal lobe short, subtruncate.

Elytra two and seven-tenths times as long as broad (2.7 × 1 mm.), sides subparallel on basal half, thence distinctly curved to apex, apices individually rounded. Anterior and intermediate tarsi longer than their tibiæ. Posterior tibiæ with three strong, equal ridges (excluding subapical one); basitarsi with three (one specimen with a rudimentary fourth), second segment with two oblique ridges. Anal style moderately long, attenuate, subtruncate at apex, two and one-third times length of apical ventral segment (1.4 × 0.6 mm.).

Length: to apices of elytra, 3.7 mm.; to tip of anal style, 5.1 mm.

Two specimens: Type from Plain below J. Kaboija, J. Midob, N. E. Darfur, August 7, 1930, on leaves and flowers of large succulent grasses; paratype from N. E. Darfur, August 5–13, 1930 (Michelmore).

This species may be separated from its closest ally, *atriventris* Pic (Rev. zool. bot. afr. 21, 1931, p. 47), by the flavocastaneous head, the black elytra, the flavocinereous pubescence, the unicolored legs, the shorter anal style and the larger size. The short description of *atriventris* indicates that the posterior tarsi of his type specimen may be missing. Other differences probably exist, but Pic's short description deals chiefly with color — the antennæ and maxillary palpi are not mentioned.

# FURTHER STUDIES OF THE TABANIDÆ OF TRINIDAD, B. W. I.

BY J. BEQUAERT

Harvard Medical School and School of Public Health,
Boston, Mass.

The publication of my list of Trinidad Tabanidæ a few years ago (1940, Bull. Ent. Res., 30, pp. 447–453) induced several entomologists to a more intensive study of these flies. Dr. E. McC. Callan submitted for identification two lots, including all specimens in the Department of Entomology of the Imperial College of Tropical Agriculture. More recently Dr. Raymond C. Shannon, of the International Health Division, The Rockefeller Foundation, forwarded to me many specimens obtained by him and his associates in the course of their studies on malaria. The result is most gratifying and has induced me to draw up a revised list of the species known from the island. This was the more necessary because recent careful work on the Panamanian fauna by Dr. G. B. Fairchild has resulted in certain corrected identifications and names. Some of these changes were decided upon in personal discussion with Dr. Fairchild, and most of them have since been published by him. None of the information given in my earlier paper is repeated here, unless it called for correction.

The number of known Trinidad Tabanidæ has risen now from 23 to 31 species, 9 species being added. One of the species of the earlier list (*Tabanus ochrophilus*) was dropped, as the specimen on which the record was based is not now available for study and was no doubt misidentified. The following changes in nomenclature were made. The species formerly listed as *Chrysops auroguttata* is now called *Chrysops pallidefemorata* Kröber. *Stibasoma dyridophorum* becomes a synonym of *S. mallophoroides*. The older name *T. limonus* is applied to the species formerly called *T. viridis*. In accordance with G. B. Fairchild's recent work, *T. amplifrons* is used for the species I called *T. trilineatus* and *T. vittiger* subsp. *guatemalanus* for the females formerly called *T. carneus*; while *T. appendiculatus* is considered a synonym of *T. lineola* var. *carneus*.

Two species of *Tabanidæ* are now known from Tobago: *Tabanus amplifrons* and *T. leucaspis*, both common in Trinidad.

In my earlier paper a brief comparison was drawn between the tabanid faunæ of Trinidad, the Antilles, and continental South America. This was somewhat amplified in my monograph of the Tabanidæ of the Antilles (1940, Rev. de Entomologia, 11, p. 271–272). The conclusions reached at the time are merely confirmed by recent additions. The purely South American character of the Trinidad tabanid fauna remains beyond dispute. All nine genera of the revised list are found on the continent. This is true also of the nine subgenera here included in the genus *Tabanus*, some of these groups being given generic rank by recent authors (*Stenotabanus*, *Leucotabanus*, *Chlorotabanus*, etc.). The 31 species likewise all occur on the American mainland, where most of them are widely distributed. On the other hand only four of the nine Trinidad genera are represented in the Antilles (*Chrysops*, *Lepiselaga*, *Dichelacera*, *Tabanus*); while of the nine subgenera of *Tabanus*, five occur in Trinidad as well as in the Antilles (*Chelotabanus*, *Bellardia*, *Chlorotabanus*, *Macrocormus* and *Stenotabanus*). Of the 31 Trinidad species, only five are definitely known from the Antilles: *Chrysops variegata*, *Lepiselaga crassipes*, *Tabanus hookeri*, *T. vittiger* (= *T. truquii* of my Antillean monograph) and *T. lineola*. (*T. ferrifer* has been recorded doubtfully from Barbados). These five species are widely distributed throughout tropical America, *T. lineola* occurring even in the Nearctic Region.

1. **Chrysops variegata** (Degeer).
2. **Chrysops tristis** (Fabricius).
3. **Chrysops fulviceps** Walker (= *C. aurofasciatus* Kröber).
4. **Chrysops pallidefemorata** Kröber (= *C. auroguttatus* var. *pallidefemoratus* Kröber, 1930, Zoolog. Anzeiger, 90, p. 72, figs. 9–10; ♀; Trinidad).

Lezard Swamp, female (R. C. Shannon); Caroni Swamp, female (R. C. Shannon).

These two specimens agree with Kröber's figures of the head, antenna (partly drawn) and wing pattern of var. *pallidefemoratus*, not with those of his typical *auroguttatus* (*Ibid*., p. 71, figs. 6 and 8). The second tergite of the abdomen bears a small median apical pale spot.

A renewed study of these specimens and of some other material in our collections has led me to separate *pallidefemorata* as a distinct species. The frons is considerably broader than in *auroguttata*; the second antennal segment is relatively shorter and the first somewhat swollen; the hyaline area in the fourth and fifth posterior cells touches the discal cell; there is no trace of a hyaline spot near the base in the first submarginal cell; and the apical dark streak of the wing is more deeply notched at the base by the hyaline area, so that its apical portion appears widened. The three females from Quintana Roo, Mexico, which I called *C. incisa* in my paper on the Yucatan Tabanidæ (1932, Jl. New York Ent. Soc., 39, for 1931, p. 535) were really *C. pallidefemorata*, so that the species appears to be widely distributed.

The specimens which I listed from Trinidad under *C. auroguttata* in my earlier paper (1940, p. 448) are not now available, so that I am unable to place them under either that species or *C. pallidefemorata*. There is even a possibility that the Trinidad cotype of *auroguttata* was really a *pallidefemorata* and that Kröber's drawings of *auroguttata* were made from the Colombia cotype (both cotypes are at the British Museum). For this reason I omit provisionally the true *auroguttata* from the Trinidad list. The female from Costa Rica (Carillo), which I reported in 1940, was Kröber's true *auroguttata* and this is also true of the Panama records published by Pechuman (1937, Rev. de Entomologia, 7, p. 136) as *C. auroguttata* var. *pallidefemorata*, and by G. B. Fairchild (1942, Proc. Ent. Soc. Washington, 44, p. 4) as *C. incisa*.

Whether *Chrysops incisus* Macquart (1845, Mém. Soc. R. Sci. Agric. Arts Lille, for 1844, p. 172, Pl. IV, figs. 12–12a; ♀; "New Grenada") was *C. auroguttata* Kröber, *C. pallidefemorata* Kröber or some other species (? *melæna* Hine) appears impossible to decide, unless Macquart's type could be found. The description is vague (the yellow stripes on the sides of the mesonotum are not mentioned) and the drawings are too crude to be reliable.

5. **Chrysops bulbicornis Ad. Lutz.**

St. Augustine, 2 females (W. Cook; one of the specimens had been named *C. læta*, a species not known from Trinidad); St. Augustine, male, allotype (A. M. Adamson); Penal, female (R. C. Shannon); also 3 females from Trinidad, without more definite locality (Stanton Crawford). The species also occurs in Bolivia (Monte S. Pablo).

The markings of body and wings are somewhat as in *C. læta* (Fabricius); but *C. bulbicornis* is readily recognized by the conspicuously swollen first antennal segment and the prominent, conical callosities of the face. In addition, the female has rows of lateral spots on tergites 3 to 6, which tend to fuse into lateral stripes, and the apical black streak of the wing fills the marginal cell completely (the hyaline area not crossing the second longitudinal vein).

*Male* (undescribed). Antennæ as in female, the first segment conspicuously swollen, pear-shaped, both in profile and from above; facial callosities very prominent, cone-shaped; eyes broadly contiguous. Head, including palpi and first two antennal segments, honey-yellow (third segment lacking). Thorax black, covered with black and gray hairs; scutellum and pleura slightly brownish; mesonotum on each side with a prominent yellow stripe. Legs mostly honey-yellow, with black pile; coxæ more brownish. Abdomen brownish-black; dorsum narrowly golden-yellow along extreme sides, with a median row of small, triangular yellow spots on tergites 2 to 5 (more rounded off on tergite 2) and small marginal lateral spots on tergites 3 to 5 (free from the median spot on tergites 3 and 4; narrowly connected on tergite 5). Wing much as in the male of *C. læta* (see Kröber, 1925, Konowia, 4, Pl. III), but apical black streak filling entire marginal cell and anal cell without distinct hyaline streak (though with a slightly paler area). Length, 7 mm.; of wing, 6.5 mm.

6. **Esenbeckia prasiniventris** (Macquart).

St. Augustine, female, the prey of a bembicid wasp, *Rubrica surinamensis* (Degeer) (E. McC. Callan); Maraval, female (Imper. Coll. Trop. Agric.).

7. **Lepiselaga crassipes** (Fabricius).

Pt. Fortia, female (R. C. Shannon).

Widely distributed in the Greater Antilles, Central and South America.

8. **Selasoma tibiale** (Wiedemann).

9. **Stibasoma fulvohirtum** (Wiedemann).

Balandra Bay, female (W. Cook); Brasso, female, biting man (E. McC. Callan); Cumato, female (R. C. Shannon); Point Gourde, female, biting man (E. McC. Callan); Rio Claro, female (R. C. Shannon).

10. **Stibasoma mallophoroides** (Walker) (= *Stibasoma dyridophorum* Knab).

Balandra, female (E. McC. Callan).

Hine, who examined the type of Walker's species at the British Museum, wrote in his manuscript notes: "Type ♀ very much like *S. dyridophorum* Knab; wings almost exactly the same; the discal spot is hyaline in *mallophoroides* and extends into second basal cell, as is the case in Knab's species. It would seem that the variation known to exist in this genus would bring the two together." This synonymy was accepted by me in 1940 (Rev. de Entomologia, 11, p. 272). *S. mallophoroides* was described from the Amazon region, Brazil.

11. **Dichelacera ochracea** Hine.

Valencia, 2 females, biting man (E. McC. Callan).

12. **Tabanus (Chelotabanus) discifer** Walker, 1850 (= *Tabanus albomaculatus* Walker, 1854).

Arima, female (E. McC. Callan); Rio Claro, female (E. McC. Callan); Tamano, female (R. C. Shannon).

The species is known also from Brazil (Pará; San Alberto on the Rio Branco in the State of Amazonas), Dutch Guiana and Venezuela. *T. discifer* was based on the female, *T. albomaculatus* on the male. Kröber (1931, Zool. Anzeig., **96**, p. 53) reported it from Trinidad and recognized that *discifer* and *albomaculatus* were the two sexes of one species. I was inclined at one time to regard *Tabanus guttigaster* Kröber (1934) (= *T. guttiventris* Kröber, 1929) as the same species and used that name in my paper on Antillean Tabanidæ (1940, Rev. de Entomologia, 11, p. 272); but this synonymy is uncertain and *T. discifer* is, in any case, the older valid name.

13. **Tabanus (Chelotabanus) ferrifer** Walker.

St. Augustine, many females and males (J. T. Gonzalves; A. C. Salazar; E. McC. Callan; A. M. Adamson; Ruth O'Connor; M. D. French-Mullen; D. K. Kevan); also one female as prey of the bembecid wasp, *Rubrica surinamensis* (Degeer). El Dorado Village, female (M. V. Beattie; named *T. ferrifer* by the late Major E. E. Austen); Nariva Swamp, female (R. C. Shannon); Mundo Nuevo, female (R. C. Shannon); Tamano, female (R. C. Shannon); Siparia, female (R. C. Shannon).

According to Dr. McC. Callan, this is one of the commonest horseflies at St. Augustine, the males being found in ones and twos sitting in sunny places from about 8 A.M. to 4 P.M.

14. **Tabanus (Bellardia) xipe** Kröber.

St. Augustine, male, October 22, 1937 (A. M. Adamson); Tamano, female (R. C. Shannon).

*Male* (undescribed). — Differs from the male of *T. ferrifer* in size, extent of the velvety-black spot of the scutellum, markings of abdomen, color of wings, presence of a long appendix at the fork of the third longitudinal vein, and shape of antennæ In all these characters it agrees with the female of *xipe*. The eyes are entirely bare and divided into an upper zone of enlarged and a lower zone of small facets.

Dr. Shannon sketched the eye of the female as purple with three green cross-bands, the upper one rather broad but short, the lower one very broad and somewhat narrowed outwardly, the middle one much narrower than the others and somewhat wavy.

According to G. B. Fairchild (1942, Psyche, 49, p. 8) *Lophotabanus* Szilády (1926) is not subgenerically separable from *Bellardia* Rondani (1863), an opinion with which I concur.

15. **Tabanus (Phæotabanus) semiflavus** Kröber.

Princes Town, female (R. C. Shannon).

This specimen agrees with two females I have seen from Brazil (Curralinho, State of Pará). The species was first described from Venezuela.

16. **Tabanus (Chlorotabanus) mexicanus** Linnæus.

Tamano, female (R. C. Shannon).

17. **Tabanus (Cryptotylus) unicolor** Wiedemann.

Mayaro, female (D. K. Kevan); Tamano, 2 females (R. C. Shannon).

18. **Tabanus (Cryptotylus) limonus** Townsend (= *Ommallia viridis* Enderlein).

G. B. Fairchild (1940, Rev. de Entomologia, 11, pp. 720–

722) established what appears to be the correct synonymy of this species. It is known at present from Mexico, Guatemala, Honduras, Panama, Colombia, Trinidad and northern Brazil.

At one time I referred the Trinidad specimens to *Tabanus luteoflavus* Bellardi (see J. Beqaert, 1940, Rev. de Entomologia, **11**, p. 272); but this was erroneous. As for the green male from Paraguay which I mentioned at the close of the discussion of *T. viridis*, it has now been recognized as that of *Tabanus* (*Cryptotylus*) *princeps* Brèthes.

19. **Tabanus (Leucotabanus) leucaspis** Wiedemann.

Princes Town, female (R. C. Shannon); Saut d'Eau Bay, female, biting man (E. McC. Callan); St. Augustine, 2 females (Ruth O'Connor); Tacarigua, several females (T. H. Khan); Tamano, female (A. M. Adamson); Maracas Valley, female (M. V. Beattie). Other females merely labeled Trinidad (Stanton Crawford).

A common species in Trinidad. I have also seen one female from Speyside, Tobago (biting man) (E. McC. Callan).

20. **Tabanus (Macrocormus) sorbillans** Wiedemann.

St. Augustine, 4 females (A. M. Adamson; E. McC. Callan) and 2 males (Ruth O'Connor); Tamano, female (R. C. Shannon).

According to a sketch by Dr. Shannon, the eye of the female is purple with 2 rather narrow green cross-bands in life.

21. **Tabanus (Stenotabanus) maculifrons** Hine.

Blanchisseuse, female (R. C. Shannon).

This remarkable little horsefly was originally described from Guatemala (1907, Ohio Naturalist, 8, p. 222; ♀). I have taken a female in Colombia (Caney River near Restrepo, Int. Meta) and G. B. Fairchild found it in Panama. The eye, which I observed in life and which was also sketched by Dr. Shannon, is pale purplish with two moderately broad, unconnected bluish-green cross-bands: one shorter, starting from the frontal callus; the other in the lower third, curved upward at the outer end.

22. **Tabanus (Neotabanus) hookeri** Knab.

St. Augustine, several females (D. J. Billes; E. McC. Callan; D. K. Kevan); also one female as prey of *Rubrica surinamensis* (Degeer) and one male as prey of *Stictia signata* (Linnæus) (E. McC. Callan); El Dorado Village, female (M. V. Beattie).

23. **Tabanus (Neotabanus) johannesi** Fairchild (1942, Ann. Ent. Soc. America, **35**, p. 164, pl. 1, fig. 6; ♀ ♂).

Nariva Swamp, female (R. C. Shannon).

This specimen was compared with a paratype from Brazil The species is known also from Paraguay.

24. **Tabanus (Neotabanus) amplifrons** Kröber (= *Tabanus trilineatus* J. Bequært, 1940; not of Latreille).

St. Augustine, several females and males, one male taken at light (E. McC. Callan; A. M. Adamson; P. C. Atteck). Tamano, female (R. C. Shannon); Toco, 2 males (R. C. Shannon); El Dorado Village, 2 males (M. V. Beattie); San Fernando, male (C. B. Williams).

It is the species which I called *T. trilineatus* in my 1940 paper. As shown by G. B. Fairchild (1942, Ann. Ent. Soc. America, **35**, p. 178), Latreille's *T. trilineatus* appears to be unrecognizable. *T. amplifrons* is known also from Texas, Guatemala, Panama, Colombia, Venezuela and the Amazon Basin of Brazil. In Trinidad it is one of the most common horseflies. According to Dr. E. McC. Callan, the males are often observed in numbers, sometimes even in hundreds, flying and hovering over roadways from about 6 A.M. to 9 A.M.

25. **Tabanus (Neotabanus) vittiger** var. **guatemalanus** Hine (= *Tabanus carneus* J. Bequært, 1940; not of Bellardi).

Moruga, female (R. C. Shannon). The females from Trinidad and Siparia, Trinidad, referred to *T. carneus* in my 1940 paper were *guatemalanus*; but the Trinidad male of *carneus* was that of *T. lineola* var. *carneus*.

The var. *guatemalanus* is widely distributed in Central and northern South America.

In a former paper (1940, Rev. de Entomologia, **11**, pp. 272 and 352), I identified *T. vittiger* Thomson (1868) with *Tabanus truquii* Bellardi (1859); but Dr. G. B. Fairchild does not agree with this. He regards Bellardi's species as unrecognizable, although possibly the same as *Tabanus amplifrons* Kröber. He also treats the Antillean specimens of *T. vittiger* as a distinct race, which he calls subsp. *caymanicus* (1942, Ann. Ent. Soc. America, **35**, p. 180); but the distinction between *guatemalanus* and *caymanicus* seems to be too finely drawn and based mainly on distributional data, not on reliable characters.

26. **Tabanus (Neotabanus) angustivitta** Kröber.

Nariva Swamp, female (R. C. Shannon).

G. B. Fairchild saw this species from Mexico, Guatemala, Panama, Colombia, Venezuela, British Guiana, Brazil, Ecuador, Peru, Paraguay and northern Argentina.

27. **Tabanus (Neotabanus) fumatipennis** Kröber.

G. B. Fairchild, who discusses this species at some length (1942, Ann. Ent. Soc. America, **35**, p. 162), saw specimens from Trinidad, as well as from Costa Rica, Panama, Brazil and British Guiana.

28. **Tabanus (Neotabanus) lineola** var. **carneus** Bellardi (= *Tabanus appendiculatus* Hine).

Yarra River, male (R. C. Shannon); Rio Claro, female, biting mule (E. McC. Callan); St. Augustine, female, prey of *Rubrica surinamensis* (Degeer) (E. McC. Callan); Maracas Bay, female (P. C. Atteck); Mayaro, female (D. K. Kevan). The specimens from Port of Spain and St. Augustine, listed as *T. appendiculatus* in my 1940 paper, were also *T. lineola* var. *carneus*.

The var. *carneus* is a common horsefly in Trinidad. It occurs over most of the Neotropical Region, from Mexico to Paraguay and southern Brazil. No other form of *T. lineola* is known thus far from Trinidad.

*Tabanus ochrophilus* of my 1940 paper is omitted here. It is extremely doubtful that the specimen I saw from Trinidad (not now available for study) was Ad. Lutz's species, which was perhaps only a variant of *T. lineola* var. *carneus*, as suggested by G. B. Fairchild (1942, Ann. Ent. Soc. America, **35**, p. 175).

The difficult group of trivittate American species, grouped under *Neotabanus*, has recently been revised by G. B. Fairchild and his conclusions are here accepted. The following key of the seven forms definitely known from Trinidad will replace what I wrote in 1940 (Bull. Ent. Res., **30**, pp. 452–453).

1. Subcallus bare and shiny in both sexes .............................. 2.
Subcallus pollinose and dull in both sexes .............................. 3.
2. Subcallus honey-yellow. Wing hyaline. Mid-dorsal stripe of a series of triangles; lateral stripes broken up into oblique spots. Female: frons about three times as high as wide, slightly narrowed below. Male: upper two-thirds of eye hairy and with the facets much larger than those of lower third. Length, 9 to 12 mm. .............................. *T. hookeri.*
Subcallus dark drown to black. Wing slightly smoky. Mid-dorsal stripe of narrow truncate triangles; lateral stripes of a series of short streaks in line.

Female: frons at least five times as high as greatest width, slightly narrowed below. Length, 9 to 12 mm. (Male unknown) ........ *T. fumatipennis.*

3. Female: frons less than three times as high as wide and nearly parallel-sided; frontal callus at least as wide as high and nearly as wide as frons. Lateral stripes decidedly step-like. Wing hyaline .......................... 4.

Female: frons at least three times as high as wide (usually much higher); in doubtful cases narrowed below; frontal callus as high as wide or higher and narrower than frons. Lateral stripes usually regular. Fore coxæ and most femora largely pale or yellowish ..................................... 5.

4. Fore coxæ and most femora largely black. Scutellum black. Mid-dorsal stripe a slender even line. Female: frontal callus dark brown to black. Male: upper half of eye hairy, but with the facets only slightly larger than those of lower half (the line of demarkation between the two types not clearly defined). Length, 11 mm. ............................ *T. johannesi.*

Female: fore coxæ and most femora pale; scutellum reddish; mid-dorsal stripe a series of contiguous triangles; frontal callus yellowish-brown. Length, 11 to 14 mm. (Male unknown) ............... *T. angustivitta.*

5. Grayish; abdominal stripes broad and quite even, covered with chalky-white hair. Wing hyaline. Female: frons nearly parallel-sided; frontal callus grownish, only slightly higher than wide. Male: upper half of eye hairy, but with the facets only slightly larger than those of lower half (the two areas not clearly defined). Length, 12 to 15 mm. ......... *T. amplifrons.*

Grayish to yellowish-brown; abdominal stripes covered with grayish-white or yellowish hair. Female: frons narrowed below; frontal callus usually decidedly higher than wide ....................................... 6.

6. Wing hyaline. Female: frons somewhat less than four times as high as greatest width; frontal callus large, yellowish-brown. Male: upper two-thirds of eye hairy and with the facets much larger than those of lower third. Length, 12 to 14 mm. .................... *T. vittiger* var. *guatemalanus.*

Wing somewhat clouded, at least along the veins. Female: frons at least four times as high as greatest width; frontal callus rather small, dark brown to black. Male: upper two-thirds of eye bare, but with the facets much larger than those of lower third. Length, 12 to 14 mm. ................ ............................................ *T. lineola* var. *carneus.*

29. **Diachlorus scutellatus** Macquart.

Trinidad, without more definite locality, female (W. Urich). This insect was sent to the U. S. Nat. Mus. and determined by Dr. Alan Stone, who sent it to me for study. The species is known also from French Guiana, British Guiana and Brazil.

30. **Diachlorus curvipes** (Fabricius).

Nariva Swamp, female (R. C. Shannon). The species is known with certainty from Panama, Colombia (Muzo, Dept. Boyaca), British Guiana, French Guiana, Venezuela, and Brazil. Surcouf's citation of "Uruguay" was an error for Paraguay; but the occurrence in Paraguay is doubtful.

31. **Acanthocera marginalis** Walker.

Diego Martin, female (D. J. Billes); Morne Bleu, 2,700 ft. female, biting man (E. McC. Callan); Talparo, female, biting man (E. McC. Callan).

# STUDIES ON SYRPHID FLIES IN THE MUSEUM OF COMPARATIVE ZOÖLOGY[1]

By Frank M. Hull

University of Mississippi

This study presents the descriptions of additional new species of Syrphid flies in the collections of the Museum of Comparative Zoölogy of Harvard University and represents a continuation of earlier studies. Again I wish to thank Professor Nathan Banks for facilities of study extended to me.

### **Syrphus graptus** n. sp.

Male. Length 11.5 mm.; wing 10.6 mm. *Head:* eyes bare, touching for a considerable distance; the middle of the posterior margins are gently excavated, the vertical triangle is brownish-yellow pollinose, the occipital pile wholly golden yellow; the front, face and cheeks are pale yellow, the upper face and remainder of face except the broad round central tubercle are covered with dense, golden pollen, more shining upon the face than upon the front. There is also on the front a large, circular, polished, shining bare area; from this area there runs upward a vertical, slender, brownish streak, not however, reaching to the point of contact with the eyes. Just above each antenna is a conspicuous shining black spot. Antennæ wholly pale orange, the base of the arista concolorous, its rather long, apical three-fifths black. Pile of front long, erect and like that of the face pale and confined to a pollinose area. *Thorax:* dark, shining golden-

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[1] Published with the aid of a grant from the Museum of Comparative Zoölogy at Harvard College. Earlier articles in this series, dealing with the Syrphids in the Museum of Comparative Zoölogy, are as follows:

I. New Species of Exotic Syrphid Flies. Psyche, xliv, pp. 12–31; pl. 2 (1937).
II. Descriptions of Some New Species of Syrphidæ. Psyche, xlviii, pp. 149–164, plate x (1941).
III. Some Flies of the Genus Volucella. Proc. New England Zoöl. Club, vol. xix, pp. 93–98 (1942).
IV. Some Flies of the Genus Mesogramma. Proc. New England Zoöl. Club, vol. xx, pp. 17–24 (1942).
V. New Species of Syrphidæ from the Neotropical Region. Psyche, xlix, pp. 84–107 (1943).

brown with still darker vittæ as follows: a pair of narrowly separated, median vittæ slightly diverging posteriorly, the posterior ends pointed but rounded on the medial surface, running nearly half-way down that part of the mesonotum behind the suture; moreover, rather widely separated from the median pair, is the outlying pair of wider vittæ, narrowly interrupted at the suture; their posterior section of which is wide but which becomes slender before it stops almost at the scutellum. Between each of the vittæ and narrowly enclosing them even at their posterior ends and including the whole of the outer lateral margin of the thorax the area is covered with light yellowish-brown, almost golden pollen; thus a large, broad, posterior semicircle lying in front of the scutellum is left bare. Pile of dorsum of the thorax and of scutellum and of pleuræ quite erect, wholly pale with a shining silky yellow luster; it is especially long just before the mesonotal suture on the mesopleuræ and the scutellum. *Abdomen:* elongate, slenderly oval, widest at the end of the third segment, very little less wide basally or at the end of the fourth segment, its greatest width not quite equal to that of the thorax; second and third segments a little longer than the fourth and fifth; fourth segment as long as its own basal width; the fifth segment is a truncated equilateral triangle. Abdomen shallowly convex, non emarginate with the ground color wholly a light rusty red or orange-brown, largely opaque but more shining on the posterior margins and on the narrow basal margins of at least the posterior segments. There is a conspicuous though not wide, transverse, uniform black band across the posterior margin of the second segment and another one about the same width similarly placed on the third segment. On the fourth segment there is a quite subapical, transverse fascia narrow towards the middle, as it nears the midline turning sharply upward as a sharp-pointed wedge of black that reaches quite to the midpoint; on its outer lateral point it turns down sharply to reach the posterior corners of the segment. On the anterior part of the fourth segment some distance from the base there is a slightly oblique slender fascia, its inner end pointed and directed towards the midline of the base; towards the base the inner ends are separated by three times their width. On the anterior half of the third segment about the same distance from the base, are a similar pair of slightly oblique stripes separated by less than twice their width. *Legs:* almost wholly light yellow, the hind tibiæ and tarsi brownish-yellow due perhaps to the fact that their pile is dark brown whereas elsewhere, except upon the apical two-fifths of the hind femora, the pile is pale. *Wings:* elongate, nearly hyaline, whole of the stigmal cell light brown, the sinuosity of the third vein very slight, the subapical cross vein long, nearly straight, sharply though slightly bent back a short distance from its apex.

Holotype. No. 23796, one male, Sozan, Formosa, June 30, 1934. L. Grissett collector.

### Syrphus ochreolinea n. sp.

Related to *orientalis* H. B. from which it differs in abdominal pattern, etc.

Female. Length 7.5 mm.; wing 7.5 mm. *Head:* shining metallic black over the vertex, the upper third of the occiput black with brassy-brown pubescence, the lower part greyish white pollinose; all of the occipital pile is long and yellowish white. The front is shallowly concave with a broad band of greyish-brown pollen across the middle which is from either side directed a little diagonally downwards. The band is of uniform width on a shining black background. Face shining black with a yellowish-brown, inverted V running from base of antennæ towards the eye margins, ending opposite the tubercle, its margins diffuse. The whole of the face except the prominent tubercle is whitish pubescent; the shining black cheeks are also whitish pubescent. Pile of face almost wholly pale; with a few black hairs along the eye margins on the upper part of the face; the pile of the front and vertex is long, erect and black. Eyes rather thickly long white pilose. Antennæ black, the third joint large, suborbicular with reddish-brown pubescence. *Thorax:* shining greenish-black with long, thick, erect, pale pile. Scutellum greenish-black, somewhat brownish on the posterior half and dark brownish pollinose; the pile on its disc is pale, along its margin is a double row of very slender, long black bristles. Squamæ whitish with yellow fringe, its surface without pile. *Abdomen:* broadly oval, the first and second segments somewhat flattened, the lateral margin of the abdomen slightly curled over but not emarginate. First segment metallic black, the second shining black with a pair of melanic spots obscurely reddish, small, oval and quite widely separated by at least twice their length. Third segment with a pair of subbasal, light brown transverse spots, each end rounded, set well back from the lateral margin, placed horizontally and separated by almost the length of one spot. Remainder of the segment shining black. Fourth segment quite similar to the third, the spots barely less wide. The fifth is segment wholly shining black its anterior corners somewhat brownish. Pile of the abdomen long and pale upon the sides of the first and second segment, shorter but pale and erect along sides of the third and fourth segments; the pile of the third and fourth segments is broadly through their middles sparse, flat appressed and chiefly black. Pile of fifth segment long and largely black. *Legs:* all of the femora black, their extreme apices brownish. Anterior tibiæ, middle tibiæ, and hind tibiæ except its extreme base, dark brown; all of the taris blackish. Pile of femora chiefly pale. *Wings:* pale brownish, the stigmal cell wholly dark brown; subapical cross vein sinuous.

Holotype: No. 23800, one female, Nikko, Japan, April 22, 1934, L. Grissett, collector.

This fly traces to *orientalis* H. B. in Shiraki's key.

### **Syrphus convexigaster** n. sp.

Related to *orientalis* H. B. from which it differs in abdominal pattern.

Female. Length 9.15 mm.; wing 8.8 mm. *Head:* upper part of occiput and vertex and front shining black, polished, black pilose. A broad, transverse, broadly interrupted fascia of golden-brown pollen lies across the quite concave lower portion of the front; its anterior margin is concave; the pollinose area is drawn out along the eye margins until it is opposite the antennæ. Face extensively light brownish-yellow and yellowish pubescent on either side from eye margin to the base of the conspicuous shining black tubercle. The yellow of each side is connected beneath the antennæ and at the eye margins about the middle of the face this yellow area leaves the eye margins and drops nearly vertically down the face, almost to the ventral angle of the oral margin; thus a wide, black middle stripe is left upon the face which tapers acutely to a point beneath the antennæ and which diverges on either side along the oral margin and connects with the black of the cheeks. Facial pile erect, sparse and black throughout; the oral margin, the extreme posterior part of the face and the cheeks also light pubescent. *Thorax:* black in color, the details obscured by grease; its pile is erect and long, though sparse and wholly pale. Pile of pleuræ long and shining yellowish. Scutellum yellow, the surface is greasy, with abundant very long fine bristles in several rows on the edge of and before the margin. The sparse ventral fringe is black. Squamæ dark brown, the lower lobe bare; the metasternum pubescent. *Abdomen:* broadly oval, much wider than the thorax, rather convex, the first segment dark shining brown, somewhat metallic on the sides, the remainder of the abdomen shining black, sharply marked with yellow bands as follows: a pair of broad, clear yellow bands on the basal half of the second segment, their inner ends rounded, and separated by a little more than their width and removed from the base of the segment by a little less than their width; their outer ends are diagonally, rounded-truncate and fail by half their width to reach the margin. On the third segment near the midline, narrowly removed from the base, their inner ends rounded, are a pair of spots that, after a short distance, are slightly narrowed and proceed towards the lateral margin which they narrowly fail to reach. Over most of their length except on their medial third they are removed from the base by at least their own width and they are separated in the middle by at least their narrowest width. Their outer ends are subtruncate. On the fourth segment there are a pair of similar bands almost as large and of the same general shape; they are slightly narrower, their inner ends almost touch the base and their later ends again fail to reach the margin. On the fifth segment there are a pair of small, oval, subbasal, yellow spots the medial ends more pointed; the slender, posterior margin of the fourth and fifth segments, except at the sides are yellowish. The sides of the abdomen are quite emarginate. The pile of the abdomen is pale yellow along the margins as far as the end of the third segment, over the yellow spots and to a varying extent beyond it, but the greater part of the pile of the abdomen, especially upon the third and fourth segments is short, subappressed and black; upon the fifth segment it is long and black. *Legs:* femora black except upon the apical fifth and with the hind femora upon the apical sixth. Hind femora unusually long and slender. Anterior tibiæ and middle tibiæ reddish, more brown upon the distal part, the latter pair diffusely yellow on the basal third. Hind tibiæ brown basally and blackish-brown on the distal three-fourths. Fore and hind tarsi and apical joints of the middle tarsi dark brown; the middle basi tarsi are brownish-yellow. *Wings:* tinged with pale brown; the stigmal cell very dark brown.

Holotype: No. 23801, one female, Nikko, Japan, July 15, 1931, L. Grissett collector.

I have carefully compared the present fly with Shiraki's descriptions of Japanese species and I fail to identify it with any of them.

### Epistrophe funeralia n. sp.

Much smaller and unrelated by pattern, etc., to the few known species.

Male. Length 9.2 mm.; wing 8 mm. *Head:* eyes touching for a considerable distance, bare, broadly excavated in the middle on the posterior margin; the posterior occiput is grey pollinose and silvery pilose, the pile becoming black towards the vertex. Vertical triangle small, brownish-black, feebly shining, black pilose. Front broadly opaque, brownish-black, feebly shining just before either antennæ; the front is narrowly light brownish-orange along the eye margins, this area expanding opposite the antennæ into the pale broadly yellow sides of the face. The front is extensively bare above the antennæ; it is long, erect, black pilose on the upper half, shorter black pilose in the yellow margins along the eyes. Pile of face black, sparse, submarginal, confined to the anterior half of the yellow stripe. Face produced forward well beyond the base of the antennæ with a strong, convex tubercle deeply concave beneath the antennæ. Face widely shining black in the middle, roughly about one-half of the facial width being black. All of the anterior parts of the cheeks and the posterior part of the occiput below light yellow, obscurely brownish between. Antennæ widely separated, the first joint black, the second joint very dark basally, the third and the outer part of the second joint light orange; the third joint broadly infuscated above. The arista is short, thick, dark in color, the tip black. *Thorax:* dark brown, feebly shining on the anterior part, more polished posteriorly; the humeri, a spot on the sides before the suture and post calli obscurely yellowish-brown. The pleuræ are metallic brassy and anteriorly they are silvery over the metapleuræ, pteropleuræ and hypopleuræ. Scutellum large, evenly rounded, colored like the thorax except that on either side there is an oval, apically separated, large diagonal but quite obscure and diffuse yellowish-brown spot. Pile of thorax erect, chiefly light brown on the dorsum, longer and black upon the disc of the scutellum where it is sparse; the long ventral fringe of the scutellum is golden-brown. *Abdomen:* slender, the sides almost parallel, tapering a little posteriorly, chiefly deep opaque black in ground color, the narrow posterior margins of second, wider ones of third and fourth wholly shining black, sides of abdomen not emarginate. The sides of first segment with a large, dull yellowish spot; on either side of the second segment and broadly separated in the middle is a large roughly triangular clear opaque yellow, sharply delimited spot, all of the corners of which are rounded, and which does not reach the side margins. On the third segment is a similar spot of the same size, narrowly separated, more oval, rather pointed on its medial ends and pear-shaped. Fourth segment with a pair of spots similar to that of third, almost connected across their somewhat wider medial ends. Fifth segment with a pair of smaller subbasal spots narrowly connected basally. The spots of the third, fourth and fifth segments are more brownish-orange; the pile of the abdomen is pale upon the pale spots of the second and third segments, upon the base and sides of second segment and basal half of third segment; elsewhere it is semi-appressed and black. *Legs:* basal half of anterior, all but the apex of the middle and the whole of the slender hind femora moderately shining black. Apices of the anterior four femora and narrow bases of the four front tibiæ light yellowish-brown. Remainder of anterior four tibiæ dark brown and the whole of the posterior tibiæ black. All of the tarsi dark brown and the whole of the posterior tibiæ black. All of the tarsi dark brown. Pile of the legs, except upon the extreme bases of the femora, black. *Wings:* strongly tinged with brown, a little more so along the anterior outer half, but everywhere diffuse; the stigmal cell the darkest of all; no stigmal cross vein present. Subapical cross vein almost straight with no sinuosity, with a slight inward bend just past its base and a slight recurrent turn just before the end; however, it joins the third longitudinal vein rectangularly.

Holotype: No. 23787, one male, New Castle, Jamaica, E. B. Bryant, Feb. 16–20.

### **Rhysops quadrimaculata** n. sp.

Not closely related to any known species of *Rhysops*; distinguished by the quadrate spots.

Male. Length 6.5 mm.; wing 6 mm. *Head:* large, the eyes touching for a considerable distance, the vertical triangle small, the occiput not protruding beyond the eyes on the upper third. The front is shining bluish-black, grey dusted on the upper half and with a narrow thin line of greyish-white pubescence running down the eye margin which expands anteriorly into a small, triangular spot on the upper part of the face and again on the lower part of the face opposite the tubercle. The face in ground color is brilliantly shining, metallic black, with perhaps a faint bluish luster. On either side of the midline there is a prominent, ventrally connected, violet stripe, its margin golden inside and out. These stripes are rather widely separated over most of their length; their outer margins are lined by a thin stripe of whitish pubescence. Lower half of face sparsely white pubescent and diagonally striate opposite the tubercle; the middle of the face is cut by four shallow grooves, the outer ones less distinct; the profile of face above the low tubercle is perfectly straight. The first and second joints of antennæ are nearly equal in length; light brownish-yellow; third joint missing. The eyes are bare. Pile of face and front light brownish-yellow, of the vertex darker. *Thorax:* very convex, shining metallic black; seen from behind there are a pair of brownish, pollinose, median vittæ which run half-way down the posterior part of the mesonotum. There are suggestions of a fourth pair of such vittæ lying some distance from the others on the lateral part of the mesonotum. There is a low but well developed, rounded bump in the middle of the anterior lateral corners of the thorax lying diagonally from the humeri. Squamæ dark brown with dark brown fringe; halteres pale. Scutellum broadly rounded, brilliantly metallic, with two or three subterminal, transverse, faint, ripple-like depressions. Pile of thorax and scutellum pale, the ventral fringe long. *Abdomen:* long and slender, rather flattened, sides almost parallel, end of the third segment barely wider than base of the abdomen. First segment shining metallic black, second shining on the basal two-fifths with a brassy or golden-brown appearance; opaque, dark sepia-brown on almost all of the remaining segments and quite to their posterior margin. Located near the base upon the sides of the second segment, not reaching the anterior corners and covering about one-half the length of the segment there is a shallow, diffuse, brownish-yellow spot; in some specimens it extends inward for a greater distance. Third segment with a pair of large, square, light brownish-yellow spots occupying the base, the entire anterior corners and the sides for one-half the length of the segment; their medial surfaces are just a little cut-away and diminished on their posterior surfaces; remainder of this segment opaque, dark sepia. Fourth segment with a pair of similar spots, slightly smaller, barely darker, and a very little closer together;

remainder of that segment shining black. The pile upon the abdomen seems to be practically absent on the third and fourth segments, though whether this is due to denudation I cannot ascertain. The sparse lateral pile of the second segment is pale. *Legs:* almost wholly pale brownish-yellow; the narrow apices of the hind tibiæ and the hind femora, a more obscure subbasal hind tibial band and the last two or three tarsal joints of all of the legs dark brown. *Wings:* very lightly tinged with brown; whole stigmal cell brown and the apical margin of the wing to just past the end of the third vein marginate with brown giving the impression of an elongate brown spot.

Holotype: No. 23785, one male. Cuba, Wright, and one paratype.

### **Baccha cubana** n. sp.

Related distantly to the *lineata* group; distinguished by the anchor-shaped abdominal pattern.

Female. Length 7.5 mm.; wing 7 mm. *Head:* hemispherical, much wider than the thorax, the eyes large, bare, their posterior margins only slightly excavated. The occiput, except at the extreme ventral part, the vertex to just before the ocelli, obscurely shining black; vertical triangle quite narrow, lateral ocellus practically touching eye margin, the ocelli set fairly well forward. Front, long widening to four times its width across ocelli with a conspicuous round black spot just above antennæ; front except for this spot, and the face obscurely shining deep yellow, a little paler on the sides. Face with a low tubercle, almost straight and vertical front tubercle to antennæ, but below the tubercle it retreats rapidly the short distance from the oral margin; there is a shallow concavity between epistoma and tubercle. Cheeks small and wholly yellow. Antennæ short, third joint a little longer than wide, the first joint almost hidden; color of the antennæ light orange, the third joint narrowly brownish above; arista blackish, basally thickened. *Thorax:* mesonotum broadly shining black; the shining yellow of the wide lateral margin of the thorax narrowly follows the suture inwardly on either side for a short distance. Pleuræ and scutellum wholly light brownish-yellow, the latter with a pair of black, short, apical bristles and just a few short black hairs on the disc. I can discern one or two tiny black hairs that may constitute a ventral fringe. Fringe may be absent. Squamæ light yellow halteres yellowish with a brownish knob.

*Abdomen:* elongate, slender, but considerably flattened, the sides posteriorly curved over narrowly along their edges. First segment short, yellow, broadly brownish across the middle; second segment barely longer than the third; third and fourth equal; fifth segment square; the second segment is almost twice as long as wide; the fourth segment just about a half again as long as wide. Second segment brown with a pair of large, oblong, brownish-orange spots well separated from the middle, anterior and posterior ends rounded, reaching the margin and on one side reaching the posterior corner. Third segment brownish-orange except as follows. a prominent median stripe the full length expanded suddenly near the apex into a marginal fascia; this fascia narrowly connects towards the side with a posterior-lateral, acute triangle of brown, produced as far forward as a distance equal two-fifths the length of the segment; the outer margin of this acute triangle is oblique. The fourth segment has a very similar pattern except that posteriorly the middle stripe reaches the apex of the segment; its lateral expansion is more or less obsolescent and the posterio-lateral acute brown triangles are well developed, no wider than these of the third segment but reach forward just past the middle of the segment. Fifth segment quite similar to the fourth in every respect except that it is smaller and that the posterio-lateral triangles are merely elongated vittæ reaching the same proportion of the segment. *Legs:* the legs seem to be wholly light yellow, basal half of the hind tibiæ barely darker because the pile appears to be darker. The pile is chiefly pale golden but on the hind femora and basal half of its tibiæ it is largely but not entirely brown. *Wings:* pale brownish; diffusely darker brown throughout the subcostal marginal cell and the apex of the submarginal cell; subapical cross vein rather sinuous, joining the third vein at right angles.

Holotype: No. 23784, one female. Soledad, Cuba, Feb. 27th, 1926, George Salt.

### **Baccha ochreolinea** n. sp.

Related to *cultrata* Austen; it is characterized by the broad abdomen and interrupted yellow fascia of the third abdominal segment, etc.

Female. Length about 8 mm.; wing 7.5 mm. *Head:* hemispherical, deeply excavated in the middle; vertex narrow, dark, obscurely shining brown, continued forward as a wedge of slightly decreasing width to the middle of the face. There is a tiny black spot above the antennæ, quadrate, connected to the slightly larger, deep lunule of brown above it. Ground color of front, face and cheeks pale yellow, the former slightly brown in the middle, the pile of the occiput on the upper fifth of vertex, front and upper part of face erect and black, a very little pale pile on either side of the tubercle. Occiput except immediately behind the ocelli pale yellowish pollinose. Tubercle small, extending barely beyond the base of the antennæ; profile almost straight above the tubercle, retreating sharply below it; the cheeks small. Antennæ light orange, the third joint broadly dark on the dorsal half and the apex and scarcely longer than wide; pile of the basal joints black; arista black. *Thorax:* dark golden-sepia with a pair of obscure, yellowish-brown pollinose vittæ extending somewhat past the mesonotal suture and between it a narrow line of the same color. Lateral margins of the thorax broadly yellow; pleuræ, except propleuræ, lower sternopleuræ, lower pteropleuræ, hypo and metapleuræ pale yellow, otherwise dark brown. Scutellum wholly light brownish-yellow with several black bristles on the margin and five or six black hairs on its disc; I cannot discern any ventral pile. *Abdomen:* broadly oval, quite flattened, the first segment yellow on the sides with bristly black pile broadly brown across the middle. Second segment almost a third again as wide posteriorly as anteriorly; shining dark brown in color and somewhat lighter along the sides with a conspicuous, transverse fascia across the middle of uniform width, slightly convex, not quite reaching the side margin. Third segment barely wider posteriorly, of similar ground color; it has a slender, basal, yellow fascia not reaching the side margins and a quite broad fascia across the middle; it is broadly interrupted in the middle anteriorly narrowly from its posterior medial corners and on each side in the middle slightly concave. This fascia does not quite reach the lateral margin. Fourth segment with blackish markings on a light yellowish-brown background as follows; the entire narrow lateral margins; on either side from the posterior margin a large triangle is directed towards the base of the segment and reaches two-thirds of its length, its medial surface is more or less straight and its outer surface approximately straight but diagonal. There is a broad, median vitta rounded off anteriorly, a little wider anteriorly and just reaching the base of the segment. The median vitta and the lateral triangles are narrowly connected along the posterior margin. The anterior corners of the segment are dark brown and connected with the brown lateral margins. Fifth segment marked in an exactly similar way, the lateral triangles more slender but reaching almost to the base of the segment and not connected with the somewhat more slender median stripe which latter is concave on each lateral surface; the anterio-lateral corners of brown are absent; sixth segment with three median vittæ of brown. Pile of abdomen wholly flat-appressed and black. Fourth segment about twice as wide as long, the third segment barely longer, the fifth barely shorter, the third barely shorter than the second. *Legs:* anterior and middle pair wholly pale yellow, pale pilose, the middle femora with a posterior row of long dark hair. Posterior femora light brown, apex yellow with a wide, dark brown, subapical annulus; almost the whole of its pile is black. Hind tibiæ except for the very narrow base wholly dark brown, blackish pilose. Hind tarsi wholly yellow. *Wings:* very darkly tinged with brown, rather deep, and elongate oval; the alulæ is small, the subapical cross vein rather sigmoid.

Holotype: No. 23802, one female. Canal Zone, Barro Colorado, July 24, 1924, N. Banks collector.

### **Salpingogaster panamana** n. sp.

Related to *cothurnatus* Bigot; it differs in the red and yellow pleuræ and yellowish brown tarsi.

Male. Length 12.5 mm.; wing 9 mm. *Head:* vertical triangle shining blackish, the front narrowly yellow upon the sides, broadly brownish-black in the middle, not especially protuberant. Face pale yellow and shining with short, pale yellow shining hair, rather sparse. There is no black or dark facial stripe. Antennæ light brown throughout, without any suggestion of yellow or orange. Occiput black, sparsely pale pilose. *Thorax:* broadly dark brown over the mesonotum which is somewhat greasy and in consequence the arrangement of the pollen or possible vittæ is obscured. Nevertheless the thorax appears to have been broadly greyish pubescence throughout the middle; it was probably vittate. The humeri, a stripe along the sides as far as the suture only, the post calli and the whole of the scutellum except for a brown transverse band, pale yellow. Pleuræ reddish brown with a broad stripe on the posterior half of the mesopleuræ and propleuræ, anterior portion of the pteropleuræ and the greater part of the sternopleuræ pale yellow. There is a second small wedge-shaped yellow spot or stripe upon the metapleuræ. *Abdomen:* chiefly yellowish, the first segment wholly yellow, second segment light brownish-yellow throughout with a slender but inconspicuous scarcely darker brownish line down the middle. Third segment yellow laterally on the basal two-fifths; in the middle and upon the entire remainder of the segment light reddish-brown. Whole of the fourth segment and the hypopygium reddish-brown. The hypopygium seen from above is bulbous at the base and drawn out into an abrupt point, therefore the hypopygium proper viewed from above looks somewhat like an acutely pointed equilateral triangle. The pile of the abdomen is pale yellowish upon the first and second segments; on the remainder of the segments it is brown but not black. The abdomen is rather slender in shape. *Legs:* anterior legs almost wholly light yellow; last four joints of tarsi pale brown, the middle pair exactly the same; hind femora brownish on the basal fifth and obscurely brownish before the apex. Hind tarsi brown, appearing darker because of the black pile, the apical joint yellow. Hind femora ventrally with sparse black spinules throughout its whole length which near the apex are arranged in a single row on each side. *Wings:* upon the costal, and upon the subcostal and marginal cells, clear yellow as far as the end of the costal cell. The outer or stigmal portion of the subcostal cell and the outer part of the marginal cell sharply dark brown, the color extended narrowly along the apical margin of the submarginal cell. The brown of the subcostal cell is definitely darker than that of the marginal cell. Also the fifth longitudinal vein throughout its posterior section and base is margined with brown. Subapical cross vein strongly sigmoid; loop of third vein deep, rising vertically.

Holotype: No. 23803, one male. Bella Vista, Panama, August 8, 1924, N. Banks collector.

This species is somewhat similar to *cothurnatus* Bigot from which it appears to differ in a number of particulars. It is considerably smaller and the tarsi are pale brown, tending rather to be yellowish instead of black as described by Bigot. Apparently the pleuræ of *cothurnatus* are black whereas here they are reddish, with a single large yellow and a single small yellow stripe. The abdomen in this species is more extensively yellowish, in *cothurnatus* reddish with the posterior borders brown. I have a specimen from Panama quite different from the present specimen and which more closely agrees in size and black pleuræ with the description of *cothurnatus* and is so close to the present species in type of wing pattern and general coloration and triangularly pointed hypopygium that the general similarity between the two is remarkable. Nevertheless they are abundantly different in many respects. It is worth noting that the description of *cothurnatus* by Sack in the revision of the genus disagrees from Bigot's description in the particulars of the color of the tarsi. Sack describes the hind tarsi as wholly yellow and the anterior tarsi yellowish with the three last tarsal joints black.

### Microdon aureus n. sp.

Related distantly to *beebei* Curran, but characterized by its golden pile.

Female. Length 19.5 mm. which includes the 4 mm. antennæ; wing 11.5 mm. *Head:* vertex and upper occiput dark, shining, metallic green, becoming more or less opaque black on a transverse band in front of the scutellum from eye to eye. Front very shallowly concave, the antennæ situated high upon the head with very short front. Pile along the upper part of the occiput exclusive of post vertex, very short, appressed, brassy yellow. Pile behind vertex longer, upright, black; immediately about the ocelli it is short, appressed, black. Upon the front there is a black pilose area upon an opaque black band; just in front of the opaque black band is a transverse band of pale brassy pile, its anterior border directed forward, its posterior border directed backward and culminating in each eye margin in a fan-like tuft of flat-lying, similarly colored pile that is directed towards the mid-line. Pile of face, except for a black area on the eye margins of the lowest part of the front everywhere pale golden, short, flat-lying and wiry. A tuft of black hairs is directed downward over the middle of the epistoma. There is a vertical band of pale pile on either side of the mid-line of the face, a transverse band from the eye margin to the anterior margin of the epistoma; there is also a rough, rounded area below the antennæ on each side, which is covered by a downward and somewhat obliquely directed area of pile running from the base of antennæ towards the eye margin. Face everywhere shining black except for a mere suggestion of a light colored spot on each side near the middle and near the eye margins. Antennæ elongate, quite slender, the third joint barely longer than the first two, the second joint not quite half as long as the first. Basal half of first joint dark reddish-brown, remainder of antennæ black. Labellum of face with a pollinia from an orchid attached to it. *Thorax:* dull black with purplish and greenish reflections, a very narrow stripe of pale pile along the margin some distance from the edge of the lateral sutures that forms anteriorly a collar of pile back of the head. A broad equilateral prescutellar triangle and the whole of the scutellum is covered with flat, long, backward-directed, thick, brilliant golden pile. The remainder of the mesonotum is covered with appressed, very dense and extremely short black pile; metanotum greenish. *Abdomen:* elongate, the second segment flattened, barely wider than long, with on its anterior margin a pair of narrowly separated, almost confluent, nearly rectangular, translucent spots; these spots are pale yellowish, unusually hyaline and each spot narrowly reaching the lateral margin in the middle of each side of the segment. Remainder of second segment and of the remaining segments wholly dull black. The abdomen, beyond the second segment, forms a stout, deep, cylindrical, bluntly-pointed, club-shaped body that is everywhere microscopically black and flat-setate. The middle of the first segment has a transverse band of golden appressed pile. *Legs:* everywhere, except narrowly at the base of the hind femora, black in color. The femora have slight greenish reflections the base of hind femur reddish brown. Pile of legs extremely short and pale, dense and appressed. *Wings:* with the usual spur vein, which is however, quite obliquely produced forward. Wing rather pointed, the posterior angles of the first and second posterior cells very much rounded. The entire anterior border of the wing dark brown including the costal, subcostal, marginal, submarginal cells, narrowly the posterior side of the third longitudinal vein, the whole of the first basal cell and both margins of the small cross vein and its connection to the fifth longitudinal vein.

Holotype: No. 23807, one female: Jatun Yacu, Rio Naxo, Watershed, 700 meter, Oriente, Ecuador (Wm. C. MacIntyre).

### Mixogaster orpheus n. sp.

Closely related to *anthermus* Walker but with minor differences in the wing venation.

Female. 12 mm. excluding antennæ; wings 12 mm. *Head:* vertex, except immediately around the ocelli, occiput, except for a diagonal stripe from the corner of the eyes, and front except for a transverse band across in front of the antennæ including the short antennal prominence and a conspicuous round spot just beneath the antennæ, everywhere light brownish yellow; the exceptions noted are brown. The following areas are also brown: an oval spot or stripe diagonal from the corner of the eyes to the back of the occiput in which there is an impressed line, the area immediately around the ocelli, a conspicuous round spot beneath the antennæ all brown. There is a large, transverse spot above the antennæ, including the short but black antennal prominence which is reddish brown and is widely separated from the eye margins. Antennæ light brown; second joint half as long as first, third joint missing; antennal pile dark brown; extreme base of first joint with a black annulus. Face rather conspicuously concave just above the middle with very sparse pale pile. Eyes bare. *Thorax:* chiefly light brownish-yellow, with a short pair of submedian, slender, brown stripes that are almost fused with a much wider pair of stripes that lie on either side of the thorax and run throughout its length and slightly converge posteriorly and whose anterior lateral ends fill out the entire corners of the thorax behind the humeri, leaving, however, a large yellow spot before the suture. Pleuræ wholly pale, shining yellow, almost bare with a single diagonal reddish stripe from base of wing down to hind coxæ and a brown stripe behind the metapleuræ. Scutellum broadly brown across the disc, the base and the posterior margin yellow; somewhat triangular in shape with rounded apex. Metanotum yellow; humeri yellow; squamæ yellow with a brown margin and fringe; halteres brownish yellow. *Abdomen:* elongate, quite petiolate; the first and second segments are subcylindrical, fused, narrowest in the middle and not quite as long as the remaining three segments. There is a reddish stripe running from the base of the second segment diagonally down the long second segment to meet the opposite stripe in the middle a short way from the end of the segment; elsewhere the first two segments are shining yellow. The remainder of abdomen is light brown, the posterior third of the third segment uniformly light yellow; pile of abdomen everywhere pale. *Legs:* wholly light yellow, the apical two-thirds of the hind femora a little darker; pile of legs wholly yellow. *Wings:* large and long, longer than abdomen, faintly brownish-yellow along the anterior half with stigmal cross vein, very short anterior cross vein and with a practically straight subapical cross vein that joins the third vein approximately at a right angle; posterior corners of the first and second posterior cells with well developed spurs.

Holotype: No. 23794, one female. Bartica, British Guiana, August 19, 1901, collection C. W. Johnson.

This fly, which is a true *Mixogaster* because of the fact that it lacks any spur or vein from the third longitudinal vein into the first posterior cell as well as by its petiolate form, is characterized by its light brownish yellow color and large wings. It was compared at the British Museum by myself with the type of *anthermus* Walk. and found to be very close to that species differing, however, in particulars of the wing venation. It is also close to *anthermus* from the Amazon region in other respects, differing in the less developed occiput, the less retreating face and in the presence of the lateral yellow spot anterior to the suture of the thorax, in the absence of a much reduced brown square upon the metanotum and in the isolated brown spot around the ocellus. There are probably other differences but the general pattern coloration in the dried specimens leaves the markings obscure.

### Planes proxima n. sp.

Related to *vagans* Wied., the anterior tibiæ are extensively dark brown, the lower part of the face is reddish brown and the abdominal pattern is different.

Female. Length 9.15 mm.; wing 6.8 mm. *Head:* eyes bare, vertex in front shining bluish-black, the latter with a broad silvery pubescent band from eye to eye which is indented above and below in the midline; almost the whole of the face is covered with pale greyish-white pubescence, worn off a little on either side below the sharp facial carina; ground color of the face metallic black, except that it is obscurely reddish on either side above the oral margin; the face is retreating and in profile very shallowly concave on the lower part. Antennæ elongate, the first and second joints dark brown, the third reddish basally and on the ventral third but otherwise dark greyish-brown; arista long, slender, reddish. *Thorax:* obscurely shining black, chiefly short pale pilose, with some black pile along the middle behind the suture and more extensive black on the sides behind the suture but beginning to vanish as it reaches the posterior calli. The pile, then before the scutellum is broadly pale, somewhat appressed and more or less directed forward and towards the sides. Seen from behind there are a pair of widely separated, broad, median vittæ of pale shining yellow pile which is directed more or less forward. Pile and pubescence of the mesopleuræ whitish; scutellum with a strong brassy cast, faintly impressed rim, its pile about half and half black and pale. *Abdomen:* elongate, narrowest at the end of the third segment where it is but little less wide than the base of the third segment. Ground color anteriorly very dark brown, almost blackish, becoming more brassy on the fourth segment. First segment shining dark reddish-brown with a strong brassy cast that is quite absent upon the next two segments. On either side of the second segment, widely separated, is a pair of large yellow spots opaque, rectangular, with corners rounded, the anterior lateral corner slightly attenuated, the posterior corners vaguely attenuated, widely separated from the lateral margins. On the third segment there is a pair of similar, smaller, more diffuse and more obscure spots. Pile of fourth segment wholly semiappressed, pale yellow and quite abundant. There are not over three or four black hairs in the middle of this segment. Pile of fifth segment erect and wholly pale. *Legs:* all of the femora very dark brown almost black with narrow reddish apices; the hind pair with the usual rather extensive thickness; its pile is pale but its ventral spines black, quite long and sharp and beginning quite in the middle of the ventral surface of the femora. Anterior tibiæ blackish-brown upon the apical half dorsally; and ventrally upon the apical two-thirds brown quite to the apex. Middle tibiæ almost wholly yellowish, pale whitish on the basal half, faintly brownish apically, the spines black. Posterior tibiæ quite arcuate, the basal third pale yellow, the remainder dark brown, the apical spur triangular but quite sharp and rather long; the pile is wholly pale except along the whole of the ventral margin there is a narrow dense band of erect black pile. Basal three joints of anterior and middle tarsi wholly pale yellow, their apical and hind tarsi light brown. *Wings:* lightly tinged with brown, stigmal cell wholly dark brown; there is no spur from the posterior corners of the first and second posterior cell.

Holotype: No. 23791, one female, labelled '*proxima*' beneath which is the label — "variety of *ejuncida*" Loew coll. There is no locality. It is presumably from the West Indies.

### Crepidomyia darlingtoni n. sp.

Related to *tricrepis* Shannon but very distinct in the smoky wing apex.

Male. Length 14 mm.; wing 10.8 mm. *Head:* rather short and therefore wide and flat; the eyes are large, conspicuous, bare, the anterior facets slightly enlarged above, touching only a short distance. Vertical triangle obscurely shining black and long, erect black pilose. Upper third of occiput black and black pilose. The whole of the flat front totally obscured by thick, microscopic, brilliant, golden pubescence. Face strongly carinate with a lateral ridge or keel reaching from eye margins of epistoma slightly concave anteriorly along the lateral keels and this broad shallow concave area is covered by pale brassy pubescence forming a broad stripe from the lateral facial strips to the oral margin; remainder of face shining black; facial strips pale pubescent; cheeks shining black. Antennæ black, the third joint with brownish pubescence, about half again as long as the third joint, gradually thickened towards the base, blackish on the basal sixth, remainder white. *Thorax:* dull black with a brownish tinge due to four very obscure barely discernible vittæ; the inner pair are shorter, more closely separated, but diverging posteriorly, the outer pair reaching to the scutellum. On the extreme anterior edge of the mesonotum lying inside the humerus there is an almost equilateral triangle of pale shining yellow pubescence. Along the dorsal suture, stopping someways from the midline there is a long, slender, marginal stripe of yellowish-brown pubescence; upon its medial ends and anterior side it curves sharply backwards for a little distance. Pile of thorax wholly suberect, black. Scutellum shining black with faintly impressed rim, its discal pile black, its ventral pile thick, long and pale. *Abdomen:* moderately long but compact, not so wide as thorax, widest at the basal third segment, but scarcely less wide either at base or end of fourth segment; wholly shining black, the first two segments somewhat flattened, the pile everywhere flat-appressed and black except as follows: sides of first segment and broadly over the anterior corners of the second nearly to the end of the segment of erect pale pile; a small, marginal, lateral, subbasal patch of white pile on the third segment and a medio-apical patch on the last segment. *Legs:* chiefly shining black, the anterior tibiæ distally, greater distal part of the middle tibiæ dark brownish-black. Anterior basal tarsi dark brown; two basal, mid-tarsal joints and the hind basal tarsal joints light brown. Hind tibiæ with a short, inconspicuous, ventral apical spur; hind femora considerably thickened in the middle, more slender on the posterior half than on the basal half and all of the thickening confined to the dorsal side of the femora. Hind trochanters with a long spur. Metasternum pubescent; without spur. *Wings:* strongly tinged with brown on the anterior-apical half, becoming diffuse posteriorly; the color more sharply delimited about the stigma, the point of fusion of the subcosta and at the separation of the first and second longitudinal vein.

Holotype: No. 23789, one male. Mounts north of Imias, Eastern Oriente, Extreme eastern province of Cuba, July 25–28, 1936, 3–4,000 ft. Darlington collector.

I take pleasure in naming this handsome species for Dr. Darlington, who has brought so much interesting material out of the West Indies.

### Temnostoma japonicum n. sp.

Related to *bombylans* Fabr., but differing in the dark pattern of the wing, the basally black femora, etc.

Male. Length 14 mm.; wing 11 mm. *Head:* eyes bare, almost touching in the middle. The vertical triangle is obcurely shining black, but only as far as the corner of the eye; the entire occiput is dull, brownish-golden pollinose, narrowly divided in the midline and extending just a little further posteriorward along the eye margin. The lower part of the front golden pubescent except for a prominent, acute, shining black triangle above the antennæ, its apex continued as a narrow line to the narrow black area between the eyes. There is a smaller, impressed black triangle within the larger one. Face shallowly concave below the antennæ, broadly shining black, finely striate in the midline, the midfacial stripe expanding to a large triangular area below the antennæ; elsewhere the face is broadly golden-yellow pubescent, and with only very short, sparse, pale pile upon the lower part of the face in front of the cheeks. Antennæ light orange, the third joint oval after an oblique fashion, its margin rounded. Arista light orange, the cheeks shining black. Front without pile, that of the vertex shining yellowish. *Thorax:* dull black, scutellum of the same color, the mesonotum with a pair of obscure greyish vittæ set close together that run half of the distance from the suture to the scutellum. There is a conspicuous, laterally widened, medially tapered, golden, pollinose stripe lying in front of the transverse suture, broadly interrupted in the middle, but continued over most of the posterior part of the mesopleuræ. There is no trace of pale pollen anterior to the posterior calli, but there is a quite obscure, reddish pollinose spot lying upon the mesonotum at the base of the scutellum. Pile of the anterior half of the thorax short and shining reddish; of the posterior half short reddish with considerable black hair around the middle. Pile of scutellum wholly reddish, of mesopleuræ whitish. *Abdomen:* elongate, with almost parallel sides, the third segment barely wider than at the end of the second segment and at the end of this segment about as wide as the thorax. Ground color of abdomen black, dull in color, obscurely shining upon the fourth and last half of the third segment and posterior corners of second. Second segment with slightly oblique, much elongated, narrowly connected yellow spots; their lateral ends are rounded and they lie on the basal third of the second segment. Viewed from behind, these spots appear to be completely interrupted. On the third segment there are a pair of similar golden-yellow pollinose spots which are more slender, reach no closer to the lateral margin, but are slightly more pointed laterally and which are narrowly connected in the middle of the medial ends. On the fourth segment there is a transverse, somewhat broader, narrowly subbasal, similar, golden pollinose band shallowly indented in the middle near its lateral ends, turning slightly downward in oblique fashion; its lateral, somewhat pointed ends do not reach the side margins. The spots of the third segment are more transverse than either of the other two. The pile of the whole posterior two-fifths of the third segment except narrowly on the sides is appressed and black; the pile of the third segment is wholly appressed with considerable black pile confined to a central area on the posterior half, elsewhere it is shining reddish. The whole of the pile of the fourth segment is flat appressed and shining reddish. Pollen of the second and third fascia more brownish; that of the second segment pale yellow. *Legs:* all of femora except their apical third or less black with sparse greyish pollen and wholly pale pile; apices of these light reddish brown. Anterior tibiæ reddish-brown, dark brown upon the anterio-medial surface of the apical half; middle tibiæ wholly light reddish-brown; hind tibiæ similar in color, a little darker upon the medial posterior margin on the apical half. Anterior tarsi wholly black, the last joint reddish brown pollinose, middle and hind tarsi wholly pale reddish-brown; pile of hind tibiæ and tarsi and a middle tibiæ and tarsi wholly pale, of the anterior tibiæ and tarsi wholly black except upon the ventral medial margin of the former and ventrally upon the basi tarsi. *Wings:* broadly reddish-brown upon the anterior half, as far as the posterior margin of the first basal and upon the first posterior cell as far as the posterior margin of the first basal and upon the first posterior cell as far as the end of the vena spuria. Anterior margin of first posterior cell broadly brownish, almost to the apex of the cell. Apical margin of submarginal cell paler. The costal and second basal cell light brownish-yellow. Vena spuria especially dark brown.

Holotype: No. 23798, one male. Nikko, Japan, L. Grissett collector, July 19, 1931.

This specimen I had tentatively determined as T. *bombylans* Fabr. I now believe that it presents specific differences from that species. It is characterized by the extensively basally black hind femora and the definitely indented and almost interrupted cross band of the abdomen and the strongly reddish pile of the thorax and abdomen.

### Temnostoma fumosum n. sp.

Distinct from *bombylans* Fabr., in the concentration of the dark wing color near the middle of the wing.

Female. Length 14 mm.; wing 12 mm. *Head:* occiput tumid, together with the vertex bare upon the upper part and shining black; front shining black, especially polished upon the lower half with a short linear stripe of brownish-white pubescence along the eye margin that begins a short distance below the ocelli. There is a trace of a similar spot in the middle of the front; it may be that the front was originally broadly light brownish pubescent. Face shining black, strongly concave on the lower portion, the bottom of the concavity lying at the tip of the antennæ; in this specimen it so happens by accident that the antennæ are folded down and just fit into the concavity. Face covered with a very sparse scattered, whitish pubescence and still more sparse, pale pile. Cheeks shining black. Antennæ large, the first two joints shining, brownish-black; the third is much wider than long with evenly rounded margins, reddish-brown, silvery pubescent. Arista very long and slender, reddish in color. *Thorax:* moderately shining black, rather convex with appressed pile which is chiefly black but is broadly reddish down the midline and again just before the scutellum. There is a narrow obscure line of pale pubescence along the outer portions of the mesonotal suture. Humeri convex, shining black, pale pilose. Scutellum obscurely shining black with some long pale pile and shorter, black, tuberculate, setaceous pile. *Abdomen:* quite convex, elongate, somewhat oval, widest in the middle of the third segment, the base of the abdomen but little wider than the apex, the abdomen somewhat wider than the thorax at its widest point. Color of abdomen chiefly black, moderately shining. On the second segment there is a pair of linear, very obscure, reddish, almost obsolescent spots; they are widely separated in the middle and do not reach the sides; they are slightly oblique and placed a little before the middle of the segment. If the abdomen is viewed from the front the spots become more evident because they are clothed with thick, pale yellow pubescence. Pile of the posterior three-fourths of the segment appressed and black. On the base and sides of the segment the pile is quite long, erect and whitish. The third segment has a pair of similar, slightly oblique, larger and more evident linear bands which almost reach the side margins and which occupy a natural depression in the abdomen; they are narrowly separated in the mid-line, are reddish in color and are outlined from in front chiefly by thin golden pile and very little pubescence. The fourth segment has a conspicuous, complete, subbasal band running almost to the lateral margin and diverging a little from the basal margin towards the sides. This band is light reddish-brown pollinose but there is some evidence that it may have been golden pollinose originally. It is sparse, golden pilose; elsewhere the third, fourth and fifth segments are shining black and semi-appressed black setate. *Legs:* femora almost wholly black; only the very narrow apices brown. Hind femora quite slender; fore tibiæ wholly black, its very narrow base excluded; middle and hind tibiæ chiefly black, narrowly brownish apically. Anterior tarsi wholly black. Middle and hind tarsi light reddish-brown on the basal three joints; others dark brown. *Wings:* with a strong brown spot on the anterior border just past the middle, occupying the region from the costa to the vena spuria and all of the basal part of the marginal cell and the area below this to the vena spuria, extending moreover along the posterior margin of the fourth longitudinal vein for a short distance on the apical side of the small cross vein, extending off on both sides of the third longitudinal vein but growing fainter apically, extending broadly along both sides of the second longitudinal vein all the way to the costa and filling the stigmal cell.

Holotype: No. 23799, one female. Nikko, Japan, July 10, 1931. L. Grissett, collector.

# SOME AFRICAN BEES OF THE GENUS NOMIA

By T. D. A. Cockerell

The bees recorded in this paper belong to the British Museum, but will be retained by me until after the war.

### Nomia semlikiana Cockerell

Uganda; Entebbe, April 12, 1914. ♀ (C. C. Gowdey)

### Nomia matha (Cameron)

Natal; Van Reenen, Drakensberg, Dec., Jan. (R. E. Turner); Cape Province; Worcester, Jan. (Turner); Milverton, Cape Town, Jan. 1926. (Turner).

### Nomia heterodoxa, sp. n.

♂. Length about 11.5 mm., anterior wing 10.8; black, with the scape red at base, flagellum obscurely reddened beneath, and the legs bright ferruginous; face very narrow, with pale cinereous hair, the lower part of clypeus swollen and exposed; vertex shining; pronotum with a narrow pale fringe; mesonotum and scutellum dull, not hairy, the mesonotum with linear notauli and a slender median line shining; scutellum elevated, with a pair of large bosses, shining at end; base of metathorax dull, with a shining median groove; tegulæ rather large (but not of the large type) with a light brown boss and subhyaline margins; wings very long, with a large dark brown stigma and brown nervures, the basal nervure, curved at lower end, meeting nervulus, the second submarginal cell small and very narrow; the wings are hyaline at base, but the apex is occupied by a very large black cloud, which includes the apical half of the marginal cell; legs slender and simple, the hind basitarsi very long, anterior basitarsi with very long hairs; abdomen with the basal tergite highly polished, the others mainly dull, without hairbands, the apical margins of second and third tergites reddened; fifth sternite with a black elevation on basal middle. Uganda; Mabra Forest, Chagwe, 3500–3800 ft., July 1911 (S. A. Neave). Related to

*N. ruwenzorica biconica* Ckll., but easily distinguished by the tegulæ and the peculiar pattern of the wings.

### Nomia heterura Cockerell

Gold Coast; Yapi, Dec. 1916 (J. J. Simpson). A typical female, with red tegulæ. The following females have dark tegulæ, but seem to belong to the same species: Gold Coast; Yapi, Dec. 1916 (J. J. Simpson), Yapi, Sept. 1916 (Simpson). S. Nigeria; Ibadan, July 27, 1920. N. Rhodesia; Buyamungoma Boma, Jan. 14, 1911 (Silverlock).

### Nomia platycephala Cockerell

Pondoland; Port St. John, March, 1924, ♂ (Turner). On close comparisons, I conclude that this is probably a form of *N. matha* (Cameron), although the wings are paler than is normal for *N. matha*. The legs are black, and it is certainly not the same species as *N. breviceps* Ckll., described from the male in 1939 as a sub-species of *N. matha*. The sexes of *N. platycephala* are tabulated in Annals Durban Museum, Aug. 1920. In Ann. Mag. Nat. Hist., March 1935. *N. matha* and the apparent synonym *N. rugicollis* Friese are discussed, and it is left uncertain whether we should recognize one or more races or closely allied species.

### Nomia laticincta Friese

Lonely Mine, S. Rhodesia, six females, Dec. 1913, Jan., March and April 1914 (H. Swale). The tegulæ vary in color, being in some specimens dark. As I suggested in 1939, this is probably to be regarded as a race of *N. murinella* Ckll.

### Nomia tricoloripes Cockerell

British E. Africa: Masai Reserve, April 26, 1913 (T. J. Anderson). ♀. The female, not before known, resembles the male in most respects, but the legs are black, except the ends of the tarsi, and the front and middle knees. The hair on scutellum and postscutellum is distinctly reddish, contrasting with the pale grey of the mesonotum. This suggests *N. murinella*, from which it is easily known by the dense fulvous abdominal bands, very broad on tergites 3 to 5. The tegulæ are translucent pale reddish, and the short flagellum is dusky red beneath. The tegulæ distinguish it from *N. tricincta* Friese, the tegulæ of which have a black boss and a hyaline margin.

### Nomia victoriella Cockerell

Uganda; between Seziwe River and Kampala, 3500–3750 ft., Aug. 27–31, 1911 (S. A. Neave). A male differs from the type by having a large red spot at each side of first tergite, as sometimes occurs in *N. stanleyi* Ckll. A typical male *N. victoriella* is labelled Uganda Prot., Entebbe (Forest), 3800 ft., July 5–11, 1911 (S. A. Neave).

### Nomia serratula Smith

Pondoland; Port St. John, male (R. E. Turner).

### Nomia polytricha sp. n.

♂. Length 8 mm.; anterior wing 6.8; black, rather slender; mandibles black; antennæ black, with the long flagellum very faintly brownish beneath; head and thorax with abundant grayish-white hair, not dense enough on mesonotum to hide the surface; face (but not front) densely covered with coarse grayish-white hair; vertex dull; mesonotum dull, a little shining on disc; scutellum shining, small, prominent, unarmed; upper sides of metathorax polished; tegulæ enlarged, with a very large black boss, and a broad posterior lobe, which is pallid but inconspicuous; wings long, dusky hyaline, the apical area brownish; stigma large, reddish brown, nervures pallid; lower section of basal nervure nearly straight, except that it is abruptly bent at lower end, meeting nervulus; second submarginal cell large and square, receiving recurrent nervure near the middle; legs slender and simple, with much pale hair, small joints of tarsi more or less reddened; abdomen with first and second tergites shining, the punctures very small; tergites with dull white hair-bands, on first confined to sides, on second broadly interrupted; no red hair at apex; fourth sternite with a large patch of pale reddish hair.

British East Africa; Kabeta, 6000 ft., April 11, 1918 (T. J. Anderson).

In my table this falls near *N. kampalana* Ckll., but the abdomen is narrower at base being subclaviform, and the dark tarsi and abdominal characters are distinctive. In Strand's table it runs out near *N. parca* Kohl. *N. kampalana* is also considerably smaller.

### Nomia elgonica sp. n.

♂. Length nearly 10 mm., anterior wing nearly 9; black, rather slender, antennæ black, hind tibiæ chestnut red, front and middle tibiæ reddened at end, tarsi pallid reddish; head circular seen from in front; face covered with slightly fulvescent hair, in one specimen partly denuded on clypeus; front and vertex dull; thorax with dull white hair, scanty above; mesonotum dull; scutellum hairy, dull, unarmed; area of metathorax a rather wide channel, broadly angulate in middle, with cross plicæ; sides of metathorax posteriorly dull; tegulæ rather elongated, posteriorly with a dark boss, but anteriorly broadly thin and hyaline; wings long, conspicuously reddened, but without a dark apex; stigma very pale red, nervures darker; basal nervure with lower section straight except at lower end, where it is abruptly bent and meets nervulus; second submarginal cell large, varying in width, receiving recurrent nervure beyond the middle; hind femora moderately stout, with a strong tooth beneath; hind tibiæ very broad apically; abdomen dull, without a red spot; fourth and fifth sternites shining, not tomentose.

Uganda; Mt. Kojanjero, S. W. of Elgon, 6400 ft., Aug. 7–9, 1911 (S. A. Neave). Two specimens.

In a series of similar species it is known by the red hind tibiæ, ordinary head, and entirely dull mesonotum, without punctures evident under a lens. It is to be compared with *N. langi* Ckll., which comes from Stanleyville in the Belgian Congo, and agrees in the toothed hind femora and red hind tibiæ; the wing is 7.4 mm. long, and the mesonotum is different. There is evident affinity with the South African *N. phenacopoda* Ckll., which is smaller, and has a broad short head, and a red spot at end of abdomen. Compared with *N. dominarum* Ckll., the stigma is very much paler, and the marginal cell is shorter. *N. snelli* Ckll., from Zanzibar, is also related, but the hair on thorax above is quite different.

# WASPS FEEDING ON COMB-HONEY

By Phil Rau
Kirkwood, Missouri

When a plate of honey is placed out-of-doors to attract honey-bees, it is interesting to see how quickly wasps are also attracted to it. Honey in a tin plate is certainly different in its setting and in its quality from the weak nectar in the flowers which wasps are accustomed to patronizing.

But if wasps and honey-bees are attracted to honey, it is strange indeed that solitary bees are not likewise attracted to it. In the clay bank in my garden, not far from the honey dish, many *Anthophora abrupta*, *Osmia cordata*, *O. lignaria* were nesting but none of these ever came to the honey. In the wooden frame above the clay bank many *Xylocopa virginica* were also nesting and even though I have often fed them honey from a glass rod while they were trying to extract nectar from the flowers, I have never seen Xylocopa go to the honey-plate.

Many bumble-bees, *Bombus americanorum*, visit the flowers nearby, but none of them are attracted to the honey in the dish. Do wasps and honey-bees learn more quickly than wild bees that honey is a richer food than nectar, and that honey in a dish is more accessible than nectar in the flowers?

The following wasps have often been seen feeding from a dish of honey:

*Monobia quadridens* L., both sexes.
*Eumenes fraternus* Say.
*Sceliphron cæmentarium* Drury.
*Polistes pallipes* Lepel.
*Polistes variatus* Cress.
*Vespula maculifrons* Buyss., workers.
*Arachnophroctonus ferrugineus* Say.

Honey-bees, as already stated, were easily attracted to a dish of honey in the grass, but what is surprising is that the dipterous, heavy-bodied mimic of the honey-bee, *Eristalis tenax* L. [C. T. Greene] was also often attracted to it and ate heavily of the honey.

# THREE SPECIES OF COLEOSOMA FROM FLORIDA (ARANEÆ; THERIDIIDÆ)[1]

### By Elizabeth B. Bryant

Among material recently sent the Museum of Comparative Zoology by Mr. George Nelson from Sebastian, Florida, were specimens of *Coleosoma flavipes* O.P.-Cambridge, described from males, and known only from the type localities in Mexico and Guatemala. Impressed by this discovery, I wrote to Dr. William M. Barrows, who has collected in Florida, and was gratified to receive in response *Coleosoma* collected by him at various times.

Among this material, I have identified not only *Coleosoma floridanum* Banks, the only species of the genus previously known from the state, but also both males and females of Cambridge's *C. flavipes* together with a male and females of an undescribed species, *C. normale* spec. nov. Of this material, *C. flavipes* Camb. and *C. normale* were taken in Florida in early summer. Cambridge does not mention dates in his descriptions. *C. floridanum* Banks proves to have a wide seasonal distribution, having been taken in mid-summer at Soledad, Cuba, and in November at Floreana in the Galapagos.

The female of *C. flavipes* is very unlike the male, as the abdomen extends in a prolongation above the spinnerets. In this respect it suggests Keyserling's figures of *Achæa* in his "Theridiidæ, 1884, 1, pl. 5."

The genus *Coleosoma* was based by O.P.-Cambridge in 1882 on the species *blandum* Camb. from Ceylon, also known only from the type, a male. Simon synonymized the genus with *Theridion*, a fact which has been the cause of some confusion. In 1884, Keyserling described and figured males, as *Coleosoma blandum* from the Marx Coll. taken at Enterprise, Florida. Mr. Banks noted the difference of his Florida specimens from the original description and in 1900, named the former *floridanum*. And in 1897, Simon reported as *Theridion blandum*, the

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[1] Published with the aid of a grant from the Museum of Comparative Zoology, at Harvard College.

Ceylon species, from St. Vincent, and casually stated that it was found in the tropics around the world. It is not improbable, that the species found on St. Vincent is either new, or one of the species found in Florida.

I wish to express here, my thanks to Mr. George Nelson for collecting at Sebastian; to Dr. William M. Barrows for generously allowing me to examine his collections from Fort Myers and to Mr. N. Banks for his encouragement and help.

### Genus **Coleosoma** O.P.-Cambridge
Proc. Zool. Soc. London, 1882, p. 426.

*Cephalothorax* longer than broad, moderately convex, sloping gradually from eye area to posterior margin, thoracic groove punctiform; *eyes* rather small, anterior row recurved, eyes subequal and equidistant, posterior row procurved, lateral eyes touching; *clypeus* very high, convex; *mandibles* vertical, small and weak; *labium* wider than long; *maxillæ* narrow, inclined over labium; *abdomen* in male, long, usually constricted about middle, with a thin, bilobed, chitinized plate at anterior end that extends onto cephalothorax and continues on venter to about the middle of the abdomen; in female, the abdomen may be cylindrical, or produced in a tubercle above the spinnerets, the chitinized plate found in male, missing; *legs* in male, first pair very long.

Genotype; *Coleosoma blandum* Cambridge, male, Ceylon.

*Coleosoma* is separated from *Lithyphantes* by the higher, convex clypeus, slender mandibles, and the abdominal plate longer both on dorsum and venter. At present the genus consists of the genotype from Ceylon, and the three species described in this paper.

### **Coleosoma flavipes** O.P.-Cambridge
Figures, 1, 4, 7, 9

Biol. Centr. Amer., 1895, 1:154, pl. 19, fig. 12. "♂ Teapa, in Tabasco, Mexico; Guatemala."

Male. Length, 2.1 mm., ceph. 0.6 mm., abd. 1.5 mm. long, 0.4 mm. wide.

*Cephalothorax* grayish-brown, more than two-thirds as wide as long, (4.0:5.5), posterior margin about one half that of anterior, sides evenly rounded, slopes gradually from eye area to posterior margin, thoracic groove punctiform, posterior margin indented with a chitinized hump on each lateral lobe, probably on which the abdomen rubs; *eyes* cover two-thirds of head, seen from above, anterior row recurved, eyes small, subequal and equidistant, posterior row slightly procurved, so that lateral eyes touch, eyes subequal and equidistant; *quadrangle* narrower in front and as high as width behind; *clypeus* strongly convex, more than twice as high as eye area, with no groove below anterior eye row; *mandibles* small, weak, vertical; *labium* wider than long; *maxillæ* more than twice as long as labium, inclined, tips almost touching; *sternum* brown, more than two-thirds as wide as long, convex, triangular, widest between I coxæ; *abdomen* cylindrical, black, constricted posterior to middle with constriction marked by a narrow white band, anterior portion larger, at base a thin, chitinized plate or sheath that extends in two blunt points over cephalothorax, and is continued on venter to fold, which is posterior to middle, dorsum with a few long colorless hairs, venter black, spinnerets at tip; legs, 1–4–2–3, long and very slender, I pair more than twice as long as entire spider, yellow with a black line on femora, tip of IV tibia and base of metatarsus dark, no spines but lines of colorless hairs; *palpus* longer than cephalothorax, dark, terminal joint very broad, embolus starts from lateral margin above in distal half, and almost completes a circle, tip with an abrupt turn, at end, a wide dark piece with an uneven tip.

Female. Length, 1.7 mm., ceph. 0.7 mm., abd. 1.0 mm.

*Cephalothorax* not as wide as in male, a dull brown, with a narrow black marginal line; *eyes* same as in male; *abdomen* a dull gray, with a median dark stripe from pedicel to tip, sides a dull gray, abdomen prolonged in a slender conical projection, so that height above spinnerets equals length on venter from pedicel to spinnerets, venter dull gray from pedicel to spinnerets, fold much nearer pedicel than in male; *legs*, long, slender, pale; *epigynum*, area not quite as long as wide, two dark tubes beneath the skin, close together at anterior end, but separating near fold where a short median dark tube can be seen.

Allotype ♀ Florida; Fort Myers, 25 June 1941, M. C. Z. Coll.
2 ♂ Florida; Sebastian, March 1944, (Nelson)
♂s ♀s Florida; Fort Myers, 25 June 1941, Barrows Coll.

The specimens collected by Dr. Barrows at Fort Myers, show great variation in color among the males. Some have the cephalothorax pale yellow and the abdomen almost white with parallel stripes of gray; these have the legs about the same color as the cephalothorax, and either no dark stripe on the femora, or the stripes very indistinct. Other males are very dark, with the abdomen black as described by Cambridge, and the legs with dark lateral lines on the femora. All however, have the abdomen constricted just beyond the middle and a very broad palpus with the same corresponding parts. The females vary as much as the males. In some the abdominal tubercle above the spinnerets is reduced to a slight hump, while in others the tubercle is long, slender and pointed. All have the median dark line on the abdomen and the epigynum is the same. The coloring also varies. Some are quite dark with a darker median line on the abdomen; others are pale with the dark median line. The legs are usually white.

A lateral view of the abdomen of the female suggests some of the figures of *Achœa* given by Keyserling in the Theridiidæ, 1884, vol. 1, pl. 5.

### **Coleosoma floridanum** Banks
Figures, 3, 6

Can. Ent., 1900, 32: 98. "2 ♂ Florida; Punta Gorda."

*Theridion interruptum* Banks, Can. Ent., 1908, 40: 205, fig. 9. "♀ Miami; Florida." (immature)

Male. Length, 2.0 mm., ceph. 0.6 mm., abd. 1.6 mm.

*Cephalothorax* brown, about two-thirds as wide as long, anterior and posterior margins about equal in width, sides evenly rounded, rather flat, slopes gradually from eye area to posterior margin, two small dark lobes near posterior margin, thoracic groove punctiform; *eyes* about cover anterior margin, anterior row slightly recurved, eyes equidistant, a.m.e. smallest of the eight, posterior row straight, eyes equidistant, lateral eyes touching on a low tubercle; *quadrangle* narrower in front, and as high as wide behind; *clypeus* vertical, slightly convex, with a groove below anterior eye row, about twice as high as eye area; *mandibles* vertical, small, weak; *labium* wider than long, fused to sternum; *maxillæ* fully twice as long as labium, inclined but tips not touching; *sternum* as wide as long, convex, dark about margins; *abdomen* more than twice as long as wide, constricted posterior to middle, but constriction not as deep as in *C. flavipes* and divisions not as globose, anterior portion largest, pale brown, with lateral dark stripes which end before the constriction, a pair of irregular cream-color blotches on posterior slopes, constriction pale, posterior portion black with no markings, at the base, a thin, chitinized plate or sheath that extends in two blunt points over cephalothorax and extends on venter to fold which is posterior to middle, venter pale; *legs* much broken, 1–4–2–3, pale, a dark line on posterior femora, tip of IV tibia and base of IV metatarsus dark, I pair about one and a half times length of spider, no spines, but lines of long hairs; *palpus* not as long as cephalothorax, pale, embolus much shorter than in *C. flavipes*, embolus starts from near base and completes about half a circle, the dark piece at tip quite narrow, extends beyond the cavity, below a larger pale piece also extends beyond the cavity.

Female. Length, 1.8 mm.

*Cephalothorax* and *eyes* same as in male; *abdomen* cylindrical, three-quarters as wide as long, overlapping cephalothorax, but with no chitinized plate as in male, two widely separated, parallel dark stripes broken about middle, with paired white flecks in area between, pale flecks on sides; *legs*, 1–2–4–3, pale, with a dark ring at distal end of tibiæ and distal end of IV femur, rows of bristles on all joints and a long dorsal bristle on tibiæ; *epigynum*, a broad median septum with large openings each side.

Holotype 2 ♂ Florida; Punta Gorda, (Mrs. Slosson), Banks Coll.

Allotype ♀ pullus, Florida; Miami, February-March 1903, (Comstock), Banks Coll.

3 ♂s 1 ♀ Florida; Fort Myers, February 1930, Barrows Coll.

♂s ♀s Cuba; Havana, Banks Coll.; Soledad, July-August, 1931, (Banks and Worley)

1 ♂ ♀s Galapagos Islands; Floreana, 12–14 November, (Norge Exped.)

The male of *Coleosoma floridanum* is easily separated from the other two species of the genus, as the embolus completes about half a circle instead of almost a complete circle. The female can be separated from the other two, by the much simpler epigynum. The parts of the epigynum are very lightly chitinized in all the specimens seen but apparently are the same in all specimens from Cuba or from the Galapagos Islands. The specimen figured is from Fort Myers, Florida.

### **Coleosoma normale** spec. nov.

Figures, 2, 5, 8, 10

Male. Length, 1.5 mm., ceph. 0.5 mm., abd. 1.1 mm.

*Cephalothorax* pale, with a narrow dark marginal line and shaded with gray posterior to eyes, rather low and flat, three-quarters as wide as long, anterior margin much narrowed; *eyes* about cover anterior margin, anterior row recurved, eyes subequal, a.m.e. diurnal, separated by less than a diameter, little nearer to a.l.e., posterior row about straight, eyes equidistant, p.m.e. largest separated by more than a diameter, lateral eyes touching; *clypeus* vertical, only slightly convex, less than twice the eye area; *mandibles* pale, vertical, weak; *labium* pale, wider than long; maxillae inclined; *sternum* triangular, dark about margins; *abdomen* pale, with two parallel dark stripes from base to spinnerets, stripes quite narrow about middle and heavier at ends, cylindrical, about half as wide as long, no indication of a constriction, chitinized basal plate narrow but divided at base into two blunt points and extends on venter to about the middle, venter pale yellow, margined with black, black about spinnerets; *legs*, broken, pale, with no indications of dark stripes or rings, no spines; *palpus* about as long as cephalothorax, pale, terminal joint very large, broad, embolus starts from side near tip, follows contour to tip, forming almost a complete circle, a pale club-shaped piece opposite bulb rests against the large black conspicuous piece at tip of bulb.

Female. Length, 1.6 mm., ceph. 0.5 mm., abd. 1.3 mm.

*Cephalothorax* and *legs* same as in male; *abdomen* cylindrical, with no indication of the chitinous plate found in male, pale, with two widely separated parallel dark stripes from base to spinnerets as in male, venter with median dark gray spot that reaches spinnerets; *epigynum* large for the size of the spider, a convex chitinized plate, beneath which can be seen the convolute tubes that almost touch at anterior end and are widely separated at posterior.

Holotype ♂ Florida; Fort Myers, 25 June 1941, M. C. Z. Coll.

Allotype ♀ Florida; Fort Myers, 25 June 1941, M. C. Z. Coll.

Paratype ♀ Florida; Fort Myers, 25 June 1941, Barrows Coll.

The male of this species has no constriction of the abdomen and the thin chitinous plate at the anterior end of the abdomen is much shorter in proportion than in the other two species. The female has the same markings on the abdomen and lacks the chitinized plate at the anterior end. The epigynum is similar to that of *C. flavipes* Cambr. but the openings are widely separated.

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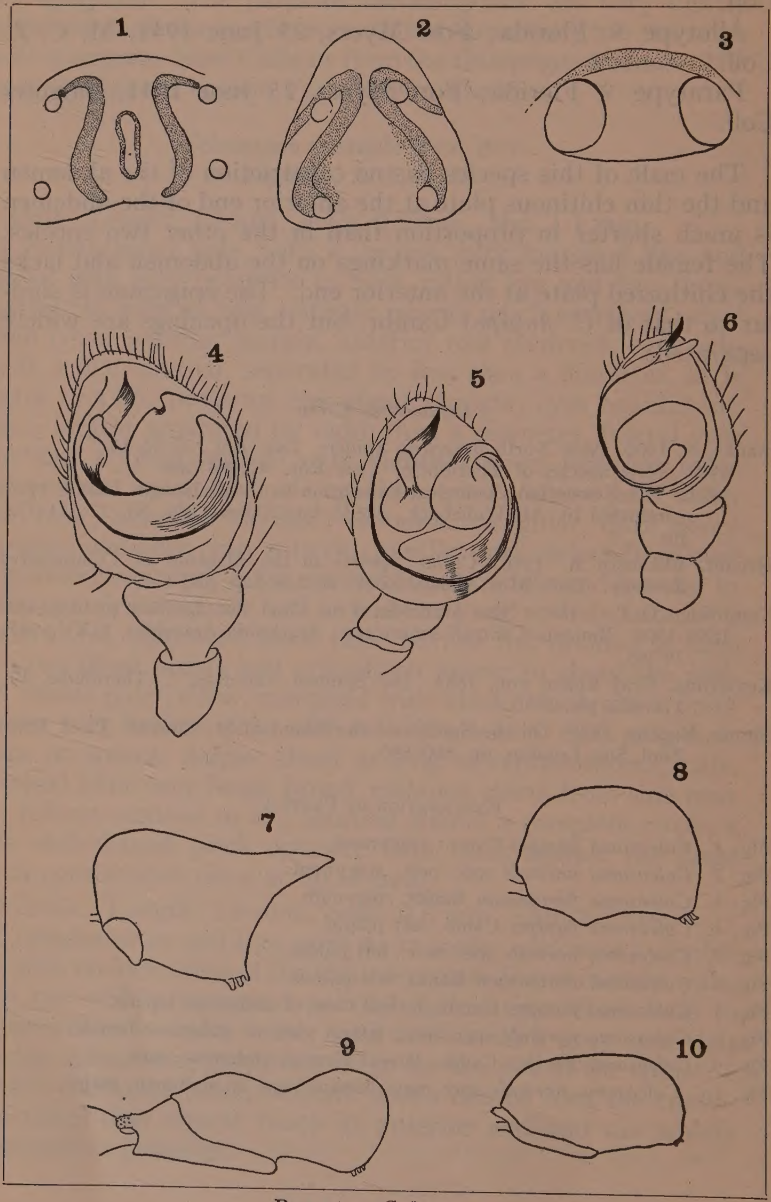
## EXPLANATION OF PLATE I

Fig. 1. *Coleosoma flavipes* Camb., epigynum.
Fig. 2. *Coleosoma normale* spec. nov., epigynum.
Fig. 3. *Coleosoma floridanum* Banks, epigynum.
Fig. 4. *Coleosoma flavipes* Camb., left palpus.
Fig. 5. *Coleosoma normale* spec. nov., left palpus.
Fig. 6. *Coleosoma floridanum* Banks, left palpus.
Fig. 7. *Coleosoma flavipes* Camb., lateral view of abdomen, female.
Fig. 8. *Coleosoma normale* spec. nov., lateral view of abdomen, female.
Fig. 9. *Coleosoma flavipes* Camb., lateral view of abdomen, male.
Fig. 10. *Coleosoma normale* spec. nov., lateral view of abdomen, male.

PSYCHE, 1944 VOL. 51, PLATE I



Bryant — *Coleosoma*

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